

U.S. House Gets Index Of Watergate Data

WASHINGTON, D.C. — A computerized index of all the testimony taken by the Senate Watergate committee has been turned over to the House for use in its presidential impeachment inquiry.

During its hearings — and behind closed door meetings with possible witnesses — the Senate group, headed by Sen. Sam Ervin (D-N.C.), kept a complete index of the possible involvement of the President and others in the Watergate burglary and coverup.

Two tapes containing an index of the voluminous material recorded by the committee are now in the hands of the House investigators looking into the possible role of the President in the case as grounds for impeachment.

The system runs on IBM 370/155 computers at the Library of Congress.

IBM Sees Government Files As Test for Privacy Guides

CW West Coast Bureau

SAN FRANCISCO — The first step in establishing guidelines for the protection of privacy might be to focus on government files as a test bed, an IBM data security expert suggested.

Larry Thomas, director of data security programs, also said IBM favors privacy legislation but cautioned that such legislation should embody uniform ways of treating data bases.

Thomas, speaking at an IBM press seminar on the quality of life, maintained that IBM and other computer manufacturers "would welcome the resolution of privacy issues and clear guidelines so we could harness the technology around those guidelines."

Any guidelines, he cautioned, should take into account that no single piece of legislation can implement all of them.

The Goldwater bill on privacy, he said, risks defeat because it treats all data bases the same way.

Much of the raft of privacy legislation, Thomas said, could be premature, and some state legislation could create conflicts where data crosses state lines.

Thomas listed four principles that IBM considers necessary for any privacy legislation:

- The individual should have the right of access to identify information about himself and know how it is used.
- He should have the ability to correct the record about himself.
- The individual should be able to prevent unauthorized use and disclosure about him without prior consent.
- The custodian of the files must be concerned with reliability and must ensure that precautions are taken to prevent misuse.

3340 Gets Fixed-Head Capability

By Vic Farmer
Of the CW Staff

WHITE PLAINS, N.Y. — IBM has married fixed-head and floating-head technologies in one module with its announcement last week of an upgrade to the 3340 disk system.

IBM inserted into the 3348 Model 70 data module used with the 3340 drives a fixed read/write arm that covers five of the 696 cylinders in the pack, and this enhanced module plus a drive option provides the user with access to 500K bytes of data without the characteristic time delay of positioning moving heads.

Access time for the moving head is 25 msec and less than 10.1 msec for the fixed head. The cylinder arrangement gives 69.3M bytes of moving-head storage.

Memory Hierarchy

The fixed-head module — called the 3348 Model 70F — gives 3340 users a hierarchy of disk memory within which frequently used information such as the index portion of an Indexed Sequential Access Methods (Isam) file could be allocated to the fixed-head storage area and the data portion allocated to the moving-head area.

The fixed head would read the index entries while the movable head would remain in the data area — which would eliminate the time required to move heads back and forth.

Previously, users have approached this level of efficiency by means of either a drum memory, or more recently by use of the IBM 2835 controller with its 2305 fixed-head disks for frequently used data in combination with IBM 3330s for mass data storage.

Typically the availability of this combination of auxiliary memories has been limited by IBM to larger CPUs, and here again IBM will not offer the 3340 fixed-head option to 370/115 and 370/125 users even though they can use the basic 3340 drives. The 2305 disks, for example,

(Continued on Page 8)

IBM 'Key' School Pacts Bared

By E. Drake Lundell Jr.
Of the CW Staff

NEW YORK — IBM went to considerable lengths during the late 1960s to keep — or install — its computer systems in "key prestige universities," according to internal IBM memos released as part of the deposition record of former Chairman T. Vincent Learson in the U.S. antitrust case against IBM.

In addition to across-the-board educational discounts for installed systems, the moves apparently involved free machines to specific prestige accounts and a tie-in of IBM research money to the amount of IBM equipment installed at a university or college.

At one point, the memos show, the firm rejected the idea of gratis machines to the top 30 universities in the country in favor of an increased educational allowance that went up to 40% on some machines.

But even while it was offering this discount across the board, the firm also allowed three universities to get free equipment — MIT, Cal Tech and New York University — and the managers of the Data Processing Group were told to draw up a five-year plan for future gratis machines.

The tie-in of contract support to the amount of equipment used from IBM can be illustrated in the following paragraph, part of a memo from Herman H. Goldstine to Learson:

"Brown (of MIT) pointed out that under the new contract MIT will be spending \$5 million a year with IBM... He says that as a result of the new

(Continued on Page 8)

Calif. Sued Over Teale, Sanders Calls Pact Illegal

By E. Drake Lundell Jr.
Of the CW Staff

SACRAMENTO, Calif. — State officials "condoned an unlawful tying agreement" on the part of IBM during the bidding of the Teale Consolidated Data Center, thus making the entire award illegal, according to a suit filed here recently against the state by Sanders Associates.

Sanders charged that state officials not only gave into what it called illegal IBM demands, but also that state officials had unwritten requirements in the contract that were not disclosed to other vendors.

Sanders asked the court here to overturn the portion of the contract that deals with CRT display terminals, or to overturn the entire contract if it is not possible to reverse that one portion. Sanders said IBM had threatened to withdraw its bid for the project management and software conversion portions if Sanders' equipment was chosen over IBMs.

The controversial contract, for a computer center that is to be the first of five

in a state consolidation move, was awarded to IBM last year and is initially valued at \$20 million even though the work on the center could amount to \$40 million over the next few years.

Three Violations

The suit essentially charged three separate violations on the part of state officials in charge of the bidding process.

First, it said, the officials used "arbitrary and undisclosed" bid conditions in their evaluation of proposed systems "which required that bids for a portion of the hardware for the system would have to be 10% lower than those bidding for the entire system."

Secondly, Sanders charged that normal good bidding practices would have forced the state and the officials concerned to give due consideration to any of the bidders, especially if their bid were lower than any other.

And finally, Sanders charged the state "condoned an unlawful tying agreement by not resisting and rejecting the threat of the selected vendor [IBM] to withdraw its proposal for services to implement the Teale Center and, therefore, entered into an unreasonable agreement in restraint of trade."

Sanders' Discovery

Sanders said it discovered the require-

(Continued on Page 2)



(CW Photo by E. Bride)

Frisco Feedback

Attendees at the San Francisco Computer Caravan try out Datapoint's terminal during show's three-day stopover. Other Caravan coverage on Page 4.

On the Inside

MDs Experimenting
With DP Decision-Making — Page 9

IEEE Intercon Panel Sees
Computing Costs Declining
— Page 33

Communications 23
Computer Industry 33
Editorial 12
Financial 37
Professional Practices 13
Software/Services 15
Systems/Peripherals 27

COMPUTERWORLD

THE NEW WEEKLY FOR THE COMPUTER COMMUNITY

TM Reg. U.S. Pat. Off.

DR. H.R.J. GROSCH, editorial director

EDWARD J. BRIDE, editor

RONALD A. FRANK, associate editor, technical news. E. DRAKE LUNDELL JR., associate editor, general news and computer industry. MARVIN ARONSON, editorial production chief. V.J. FARMER, systems editor. DONALD LEAVITT, software editor. MARY UPTON, financial editor and assistant computer industry editor. LESLIE FLANAGAN, photography editor. JUDITH KRAMER, copy editor. PATRICK G. WARD, TONI WISEMAN, MARGUERITE Y. ZIENTARA, staff writers.

MARVIN SMALHEISER, West Coast bureau. J.H. BONNETT, European bureau. HIDEKI SUNA SAKAI, Asian bureau.

CONTRIBUTORS: J. DANIEL COUGER, education column. ALAN TAYLOR, Taylor Report and professional practices.

NEAL WILDER, vice president, marketing. DOROTHY TRAVIS, sales administrator. JUDY MILFORD, advertising coordinator. KATHRYN V. DINNEEN, market research.

LEETE DOTY, production manager. HENRY FLING, production supervisor.

W. WALTER BOYD, publication manager. PATRICK J. MCGOVERN, publisher.

EDITORIAL OFFICES: 797 Washington St., Newton, Mass. 02160. Phone: (617) 965-5800. Telex: 92-2529. Los Angeles: 963 N. Edgehill Drive, Los Angeles, Calif. 90026. Phone: (213) 665-6008. Europe: Computerworld, c/o IDC Europa, Ltd., 140-146 Camden Street, London NW1 9PL, England. Phone: (01) 485-2248/9. Asia: Computerworld, c/o Dempa/Computer World Company, Dempa Building, 1-11-15, Higashi Gotanda 1-chome, Shinagawa-ku, Tokyo 141. Phone: (03) 445-6101. Telex: 26792.

Second-class postage paid at Boston, Mass., and additional mailing offices. Published weekly (except a single combined issue for the last week in December and the first week in January) by Computerworld, Inc., 797 Washington St., Newton, Mass. 02160. © 1974 by Computerworld, Inc.

50 cents a copy, \$12 a year in the U.S.; \$13 a year in Canada; all other foreign, \$36 a year. MARGARET PHELAN, circulation manager. Four weeks' notice required for change of address. Address all subscription correspondence to circulation manager, Computerworld, 797 Washington St., Newton, Mass. 02160.

Reproduction of material appearing in Computerworld is strictly forbidden without written permission. Send all requests to publication manager.

Computerworld can be purchased on 35mm microfilm in half-volumes (six-month periods) through University Microfilm, Periodical Entry Dept., 300 Zeeb Rd., Ann Arbor, Mich. 48106. Phone: (313) 761-4700.

COMPUTERWORLD, INC.

Patrick J. McGovern, president
W. Walter Boyd, executive vice president
Robert M. Patterson, vice president, int'l.
T. Neal Wilder, vice president, marketing



POSTMASTER: Send Form 3579 (Change of Address) to Computerworld Circulation Dept., 797 Washington St., Newton, Mass. 02160.

Subscribe to Computerworld.
Use the coupon below.

TP Users Deluged by Products in Dallas

By Ronald A. Frank
Of the CW Staff

DALLAS — More than 1,500 data communications users attended the Interface 74 Conference and Exhibition here last week where several teleprocessing products were introduced including an IBM-compatible 3270-type CRT from Terminal Communications, Inc.

The Model 275 is said to be "15% to 20% less" than the comparable IBM unit while offering additional capabilities.

The Model 275 can handle data at speeds up to 4,800 bit/sec and provides an off-line diagnostic capability in case of malfunctions. The display also provides off-line format generation and data entry and is priced at \$4,625 or \$125/mo on a one-year lease.

The Raleigh, N.C., company also upgraded its IBM 2740-type terminal from a Selectric printer to the Diablo-type print mechanism. The output printer version,

designated the Model 234, is priced at \$3,950 or \$120/mo on a one-year lease. A keyboard model of the unit costs \$5,750 or \$200/mo.

Com Data Corp., Niles, Ill., used the Diablo print mechanism to introduce a teleprinter/plotter called the Series 933. Featuring graphics output and justified type, the plotter costs \$4,000 on a 90-day delivery schedule. The company also showed its Model 302C2-13 300 bit/sec originate-only acoustic coupler which can record or play back data from any Philips-type cassette recorder.

The device is connected by a cable to the usual jacks on a tape recorder and can be used for on-line and off-line buffer storage, a spokesman said. Priced at \$425, the unit is described as a substitute for a paper tape unit on a teletypewriter and can handle data at speeds up to 300 bit/sec.

In the modem area, two 4,800 bit/sec

units were introduced. Livermore Data Systems showed its MOS data set designed for dial-up or private lines. The "dynamically equalized" unit has a 150 bit/sec reverse channel and features a two-digit line quality indicator.

The device was demonstrated using C-2 conditioning specifications as a reference for the line indicator, a spokesman explained. The modem has a two-channel multiplexing capability and costs \$2,950 from the firm in Livermore, Calif.

I.I. Communications Corp. showed a carbon copy of the Bell 208A data set which is licensed by Western Electric. It duplicates all Bell features and is priced at \$2,650 for immediate delivery from the firm in Lionville, Pa.

Telefile Computer Products, Inc., Irvine, Calif., introduced a synchronous high-speed programmable store-and-forward message-switching system. The TCP-644 system is said to allow the user to operate with remote terminals on each of its 16 lines at data rates up to 50 kbit/sec.

The system acts as both a data concentrator and traffic controller for both IBM and non-IBM terminals. Up to 464M bytes of on-line disk storage can be included. The "base price" of the system is \$73,400 or \$1,536/mo on a five-year lease.

Computer Transmission Corp. (Tran), El Segundo, Calif., demonstrated an on-line link to a remote-processing network at three campuses at the University of Indiana. The network included the Tran M3000 digital "Pacuit" circuit switch which is said to automatically route remote terminal users to the CPU of their choice.

The M3000 provides single-number phone access to multiple-speed CPU resources and includes an autospeed terminal recognition capability. A complete system including multiplexing capability would range from \$60,000 to \$100,000.

Calif. Sued Over Teale Pact

(Continued from Page 1)

ment that independent vendors would have to offer equipment at 10% under the price of systems vendors only after the contract had been awarded to IBM.

Sanders, the court filing indicated, "had no knowledge of this condition which was without basis in fact or practice of the trade and, consequently, ... was foreclosed from properly evaluating the factors relating to the Teale Center procurement."

Sanders claimed the various systems it proposed would have saved the state a great deal of money over the comparable IBM systems that were finally chosen.

These savings would have amounted to at least \$179,415 the Sanders filing indicated, and could have run as high as \$385,029 over a 58-month period.

Under state law the state officials concerned therefore should have at least negotiated with Sanders about the contract but they "refused" to do so, the complaint said.

The fact that state officials gave in to IBM in the case not only violates state law, Sanders said, but also violates the federal Sherman and Clayton antitrust acts.

Tying Charge

One of the reasons given for rejecting the Sanders bid on CRT displays, the filing said, was because IBM had threatened to withdraw its bid for the project management and software conversion parts of the contract if Sanders equipment were chosen over that offered by IBM.

Therefore, the suit said, IBM was il-

legally "tying" its contract bid on project management and software conversion to the CRT display portion of the contract — a practice that is outlawed by the Sherman and Clayton acts as well as the California Cartwright Act on business practices.

By failing to "reject or resist the threatened withdrawal of services," the state officials condoned the unlawful tying agreement contrary to the public policy and laws of the state," Sanders alleged.

By doing so, the state officials involved "entered into an invalid contract," the suit charged, and those officials "have therefore abused their discretion and exceeded their authority and power."

A hearing on the case has been scheduled in the Superior Court of the State of California in Sacramento on April 9.

Centralization Decentralized?

SACRAMENTO, Calif. — While Sanders was in court challenging the entire contract for the Teale center here, a move in the legislature may indicate the state is losing its taste for consolidation as a guiding principle for its DP operation.

A concurrent resolution introduced by two assemblymen proposes a delay in the conversion of programs that are to be used in the Teale Center and a further study of the idea of running legislative programs in the consolidate facility.

The resolution noted the center "is in a very early state of development with numerous uncertainties, each one being considered by the legislature."

It asked that "the conversion of pro-

grams which are now processed by the Department of General Services' computer be delayed" and that a joint committee "conduct a feasibility study to determine the advisability of converting computer programs required by the legislature ... and to examine the alternatives for providing the required computer capability."

It would authorize the joint committee to "utilize computer simulation techniques ... to determine the ability of the equipment installed at the" consolidated center "to meet in a timely and economical manner the computing requirements of the legislature when the center is fully operational."

ATTACH LABEL HERE for address change or inquiry. The code line on top may not mean much to you, but it is the only way we have of quickly identifying your records. If you are receiving duplicate copies, please send both labels. Please let us know four weeks before you plan to move. List new address below and include a current mailing label or your old address.

First Initial	Middle Initial	Surname										
Your Title												
Company Name												
Send to Address												
City										State	Zip Code	

Address shown is: ☐ Business ☐ Home ☐ Check here if you do not want to receive promotional mail from Computerworld.

CHECK HERE TO ENTER YOUR SUBSCRIPTION

One year for:
☐ U.S. — \$12
☐ Canada — \$13
☐ Other foreign — \$36

☐ Charge My American Express Account:

--	--	--	--	--	--	--	--	--	--

☐ New subscription
☐ Change of address

If charge we must have cardholder's signature:

PLEASE CIRCLE 1 NUMBER IN EACH CATEGORY

YOUR INDUSTRY

- 01 Mining/Construction/Oil & Refin.
- 02 Manufacturing — Computer or data system hardware/peripherals/other associated mechanical devices
- 03 Manufacturing (other)
- 04 Utilities/Comm Sys/Transport
- 05 Wholesale/Retail
- 06 Finance/Insurance/Real Estate
- 07 DP Serv. Bureaus/Software/Plann.
- 08 Business Services (except DP)
- 09 Education/Medical/Legal
- 10 Federal, State and Local Govt.
- 12 Communications/Printing/Publ.
- 13 Other:

YOUR FUNCTION

- 01 Corporate Officer
- 02 Data Processing & other Operational Mgmt
- 03 Data Processing Professional Staff
- 04 Consultant
- 05 Lawyer/Accountant
- 06 Engineering-Management/Scientific/R&D
- 07 Sales/Marketing/Account Exec.
- 08 Librarian/Educator/Student
- 09 Other:

COMPUTERWORLD

Circulation Department
797 Washington St., Newton, Mass. 02160

Vendor Resources, Software Adaptability Important in Package Selection

PRINCETON, N.J.—A source maintenance system is one of the most heavily used software packages a computer installation will ever invest in, according to ADR, the Princeton software house. At most installations, its frequency of use over a long period of time will exceed even that of IBM's compilers and the linkage editor. An equally important consideration, says ADR, is the potential life span of the source maintenance system. Once a computer installation becomes dependent on it, the maintenance package is likely to be an integral part of their operation for many years to come, through all kinds of environmental changes and equipment upgrades, such as S 360 to S 370, DOS to OS, and 2314 to 3330 or 3340 discs. The vendor must have the resources, and the software must have the versatility required to adapt to these changing conditions.

New File Design Developed

ADR's source maintenance system, The LIBRARIAN, has undergone evolution-

ary development since the 15-year old independent software house first introduced it five years ago. Initially it operated under OS and supported tape libraries only; subsequently a DOS version was developed, followed by support for random access disc libraries in both the OS and DOS versions. Recently, a new storage technique known as AFO—Advanced File Organization—was incorporated into The LIBRARIAN. This technique is designed to optimize performance when libraries are allocated to the large-capacity 3330 and 3340 discs. AFO, which required over 3 man years of development effort, features a "floating directory" which automatically increases its capacity as an installation's storage needs grow. The new technique, which is conceptually similar to VSAM, obviates the need for reorganization or periodic maintenance of direct access libraries.

Facilities for Updating and Backup

The LIBRARIAN provides a number of features for programmers, including

updating commands that operate on complete statements or strings of characters within statements. Programmers can make temporary or permanent changes to a source program and pass either test or production versions of a program to any of IBM's language translators. Facilities are provided to protect against updating an out-of-date or mis-named program, and to prevent redundant application of the same set of changes. All changes successfully applied are summarized and printed in a supplementary report; each statement changed has the date of change permanently associated with it for auditing purposes.

The LIBRARIAN provides facilities for the creation of disc libraries and for initial loading of data into these libraries from cards or from libraries supported by other maintenance systems. Manual or automatic back-up and restoration of libraries is supported, and several levels of security are available for protection against unauthorized data access or modification. Also supplied with

the system is an interface to IBM's TSO; other ADR software products are equipped with interfaces permitting them to directly access data stored under The LIBRARIAN.

The system is installed by ADR field personnel and is available under monthly or permanent licenses which incorporate a 30-day no-obligation acceptance period.

Context Editing Aids Program Maintenance

PRINCETON, N.J.—The ability to make character string substitutions is an important characteristic of any source program maintenance system, according to ADR. All time-sharing systems support this feature, and it is equally important in a batch-oriented program like The LIBRARIAN. Character string substitution, or context editing as it is sometimes called, involves searching a file for a designated string of characters, and when located, substituting a second character string for the original. Other characters in a record that is context edited are expanded or contracted according to the relative length of the two strings involved in the operation.

Used in Global Operations

Context editing is highly useful when making global changes to a source program. For example, if a data name in a COBOL program is changed, all procedure division references to that name must also be changed. Context editing allows a programmer to replace all occurrences of the old data name with the new name in a single operation. A summary printout of all records modified by the edit function is produced for verification purposes. In addition to its value in program maintenance activities, context editing can be quite useful when preparing and modifying textual material such as memoranda or narrative descriptions of programs and systems.

Source Maintenance System Nears 1200 Installations

PRINCETON, N.J.—ADR reports that its source program retrieval and maintenance system, The LIBRARIAN, is installed at almost 1200 sites throughout the world, making it the most widely used program of its kind. In addition to sites in almost every state in the U.S., including Alaska and Hawaii, The LIBRARIAN is heavily used abroad. France and Canada top the list of foreign countries with multiple installations of The LIBRARIAN, followed by the Scandinavian countries, Switzerland, and Belgium. The system is also in use at computer installations in Brazil, Japan, and Australia.

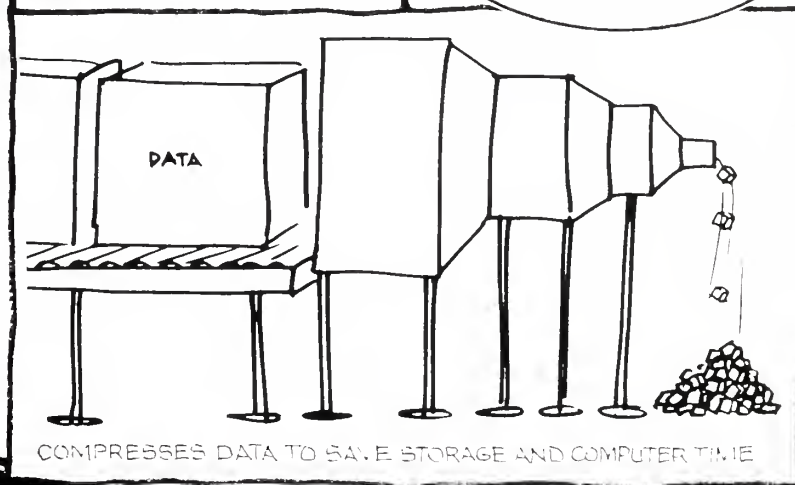
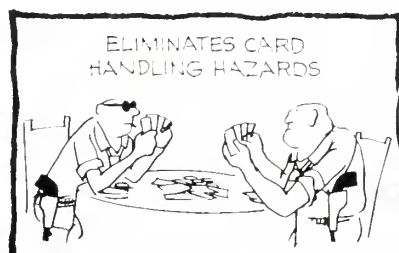
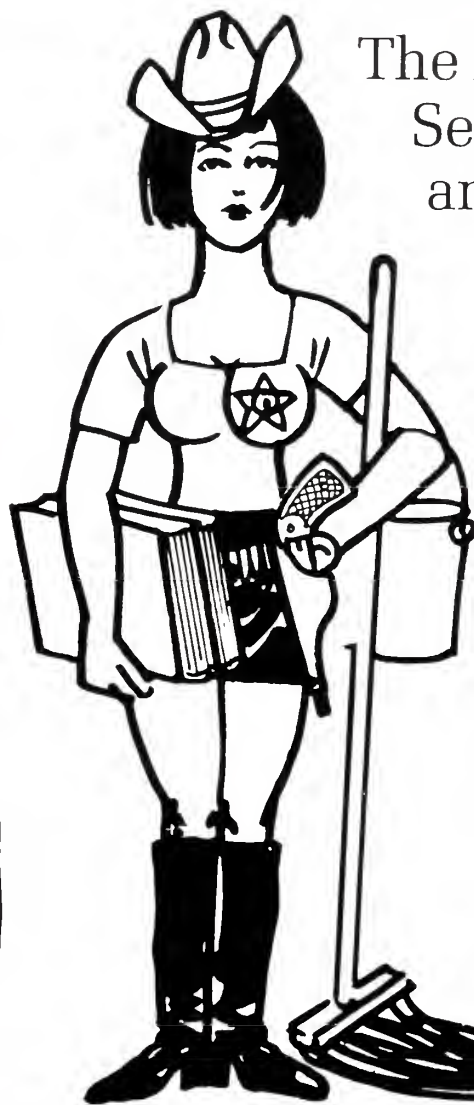
Supports Many Devices

The LIBRARIAN was first introduced by ADR in 1969. It operates on IBM S 360 and S 370 under OS MFT, MVT, VS1, and VS2. The DOS version operates with POWER and GRASP and under DOS VS. Devices supported include all types of tape drives and 2314, 3330, and the new 3340 disc drives.

Did You Know?

One of a series MAKING IBM INSTALLATIONS WORK BETTER

The LIBRARIAN. All-in-One Security Guard, Auditor, and Maintenance Man for Your Programs.



The LIBRARIAN is at work at 1200 companies around the world... maintaining, auditing, and protecting source programs. Shouldn't your company gain these benefits too?

Programs represent one of your company's major assets... perhaps its largest. Whether you're a programmer, data processing manager, director, controller, president, or company friend, if you think programs are valuable, then protect them. Look into The LIBRARIAN from ADR. You owe it to your company.

For additional information, just send us the attached coupon, or contact any ADR office.



APPLIED DATA RESEARCH

THE SOFTWARE BUILDERS™

ADR software products: in use at over 3,000 installations worldwide.

APPLIED DATA RESEARCH, INC.

ATTENTION: Mr. J. J. J. J.
Route 209, C-2, Princeton, New Jersey 08540
Telephone: 609/924-0100

Please send me information about The LIBRARIAN.

Name _____
Company _____ Title _____
Address _____
City _____ State _____ Zip _____
Telephone _____

Computer Configuration

Library is maintained in:
AMTDF O/A II for mainframe and desktop
MVS/DBD for mainframe and desktop
SAM for planning through simulation
PI SORT for faster sorting
POSCEE for on-line program development

U.S. Offices in Boston, Chicago, Cleveland, Houston, Los Angeles, New York, Pittsburgh, Princeton, Washington, D.C.
Representatives in Australia, Austria, Belgium, Brazil, Canada, Denmark, England, Finland, France, Germany, Korea, Italy, Japan, Mexico, Netherlands, Norway, Philippines, Puerto Rico, Singapore, South Africa, Spain, Sweden, Switzerland, Taiwan, Thailand, West Germany.

Print Quality, Training, Too

Document Design Crucial to OCR

SAN FRANCISCO — In no other area of data entry is document design as important as in optical scanning, Peter Vergara, assistant vice-president for system development at the Bank of California, told a Computer Caravan workshop last week.

In listing the main requirements for operating an OCR system, Vergara noted the Bank of California uses its IBM 1287 OCR equipment to process some 40,000 source documents daily for a large oil company. One problem, Vergara said, is that the bank does not control the

printing of the forms.

"We had a hard time convincing the customer that he had to use a certain color non-reflective ink," he said. "They didn't like it because the blue clashed with their logo."

Design Affects Throughput

Vergara listed paper stock, reference marks and size considerations as other factors impacting document design which, he said, directly affects throughput.

The other requirements for operating an OCR system he included were:

- Print quality.
- Training.
- Error correction, which he said probably entails the use of another machine. Bank of California is currently using key-punch machines, but is considering going on-line with CRT equipment.
- Throughput consideration.
- Programming.
- Feedback reporting — to control errors. This, Vergara said, is a must for quality control in a numeric handprint environment.

Users Concerned With Physical Security

By Toni Wiseman
Of the CW Staff

SAN FRANCISCO — Despite the controversy stirred up by the Equity Funding scandal, a random sampling of users at the Computer Caravan here indicated that although there is concern about data security, the main precautions taken so far by users have been in the area of physical security.

The data processing center for the Space Applications Corp. is so isolated that it doesn't present much of a security problem, according to James S. Hanson of the firm.

Data security is a problem, he acknowledged, but he said one company he knew of had worked with IBM on resource security and "they found that overhead encountered in installing a foolproof system is prohibitive."

The small user is more concerned today, aware of the problems, he said, noting that vendors will be finding it more difficult to sell systems which don't guarantee the integrity of the data.

"But," he said, "realistically, there is too much variation from

system to system and installation to installation for there to be 'one' answer to security. And anything else, we can't afford."

Hanson suggested that minis, as low-cost systems which can be wholly integrated within a company, within one location, present an attractive solution to many control problems.

"Whereas before you had to go to a sharing company because of the high cost of storage," Hanson said, "today you can totally isolate your data base with a mini system."

Many companies rely on off-site backup storage as a means of

Watch Specs in Choosing Equipment

By a CW Staff Writer

ANAHEIM, Calif. — Careful use of written specifications and preplanned evaluation procedures will help users select equipment that is most appro-



priate to their needs, John P. Elliot, manager of research, systems and planning for the Los Angeles Department of Water and Power, told a Computer Caravan workshop here.

"Equipment selection proceeds in a series of steps," Elliot said,

"each leading to a more complete definition, or specification of the functions that must be performed," and the way in which they are to be carried out.

"As the equipment study proceeds, the specs become progressively tighter and the number of alternatives shrinks," he added, "until you are left with only one solution, and a specification that is almost a detailed contract."

The first step is to write down a statement of one's initial objective, using functional terms, and including constraints, he said.

Then comes a brief literature search to identify the types of equipment which might meet

the user's needs, Elliot stated.

After that, the user must re-evaluate his objectives, and think of alternative ways to achieve them.

Those concerned in the company should review the objectives and the different approaches until there is substantial agreement, Elliot stated.

For each alternative, the required and desirable functional characteristics of the equipment needed must be defined, Elliot continued. Then constraints for the equipment must be listed.

In the equipment specifications the user prepares, "include the contractual terms and conditions you desire, delivery dates expected and any technical installation support you may need," Elliot remarked. Then "write down a plan for evaluating the alternatives and reaching a decision."

After having prepared specifications for each alternative, and estimated the likely cost from published sources, the interested people in the organization should review the plans.

Then the user can contact potential vendors, Elliot said.

After the vendors' response the user should do a rough evaluation to find the likeliest alternatives and then concentrate on the best of these, and rewrite the specification in more detail, Elliot said.

This specification is almost a contract. It must go back to the vendors for their proposals.

The next step is to negotiate a contract, he continued.

"If the terms are complex, the exposure to loss large, and you are inexperienced, it would pay to obtain professional counsel experienced in computer contracting," Elliot advised.

Getting Along With Vendors

ANAHEIM, Calif. — Success in a multivendor environment is based on making the vendor realize he has almost as much to lose as the user if he doesn't perform, according to users at a Caravan seminar on multivendor installation management problems.

Isaac N. Main of California State University and Colleges told users a good, solid relationship with vendors will resolve many potential problems.

"But you have to know more than all of them," he said.

"You have to be able to diagnose your own problem. You may have to invest in some test gear or technical skills to be able to point your finger at the problem."

"Otherwise, they will point fingers at everyone else."

Participants indicated they found it was better to have one person doing maintenance if possible.

If a local or regional support person doesn't respond, Main suggested the user escalate his protest to higher and higher levels of management until results are obtained.

He said halting payments may be necessary and cited a case where lease payments were made to the FCC instead of the vendor pending resolution of a problem.



CW Photos by T. Wiseman

Yundt

Hanson

Requero

security, mainly guarding against the hazards of fire, according to Lon Kuehl of Prudential Overall Supply.

"We have a backup set of tapes in a vault on-site and another set in a vault off-site," he said, "and really no security apart from that, except for a locked door at night."

Rene Requero of McCormick & Co. said his firm also relies on remote site backup for file and program storage.

"Most of our files are on-line all day long," Requero said, "so any DP staff can probably get at it if they want."

Requero added that his company is considering instituting some type of software protection because during conversion it found programs were missing. "We're evaluating a package from Panvalet right now," he said, "to try and control our own people's access to program and files."

"We've always had a password system as part of our security," said L.C. Kestrey of the Los Angeles Department of Water and Power, "but we're seeing it enforced more today than before."

Aside from that, he said, security changes have really only been physical, such as replacing

glass walls with solid ones with locking doors.

But, in the opposite direction, William Yundt of the Stanford Center for Information Processing stated his center had relaxed its physical security.

"We had a lot of student unrest three years ago, and the computer center was always a prime target," he said, "but today things have calmed down a lot so we can cut down on the chain

CW Inquiring Photographer

fences, the extensive outside lighting and the roving guards."

All the security measures, he said, had detracted from the effectiveness of the computer center because they made it difficult for the users to get into the user preparation areas. "The tighter the security measures, the harder it was for students to get in, but also for users to communicate with the DP staff," he commented.

Today, he noted, the main problem is not with destruction of data and equipment but with students "poaching" or using someone else's number to avoid being billed for computer time.

First Justify On-Line Move

SAN FRANCISCO — "If you don't have to go on-line, don't."

That advice came from Jed Allen, manager of systems development for Management Systems Corp., Salt Lake City, as he told users at a Caravan seminar on data entry of an installation that saved \$25,000 a month by switching to a key-to-disk system.

However, Allen warned not to go to key-to-disk unless it can be justified, and justification will depend on the volume and the environment.

Management Systems Corp. switched to a Four Phase Systems key-to-disk system from a Flexowriter match-merge process.

The installation includes six systems with 83 terminals, used to handle the Mormon Church's genealogical records.

The system was selected partly because it offered a large character screen which suited the church's application.

During the discussion, it was brought out that training for the key-to-disk system is simplified in that the screen can portray the actual form the operator is using.

However, Allen said that while expanded prompting is helpful initially, it is not really necessary after the initial training period and may actually be distracting to the operator.

Operators get up to speed on key-to-disk in from three days to a week, according to Allen and other participants in the discussion.

Floppy disk, he said, has been found to be advantageous because it is possible to get stand-alone units fairly inexpensively.

Staff Training 'Worth Price'

SAN FRANCISCO — The dollars spent on training entry- and management-level personnel are more than justified in terms of efficiency and decreased turnover.

That was the consensus at a Computer Caravan User Forum panel here on personnel in which career pathing and careful evaluation were stressed.

Paul Osborn, manager of data processing, Amfac Merchandising Corp., Brisbane, Calif., said his firm spends \$400/mo for training — video assistance and textbooks — and the amount "was more than justified by the dollars saved in improving technical skills."

Osborn said, "Before we sell or evaluate or train, we must ask how good do we want the people to be... We must look for the best possible people we can get and examine our own expectation."

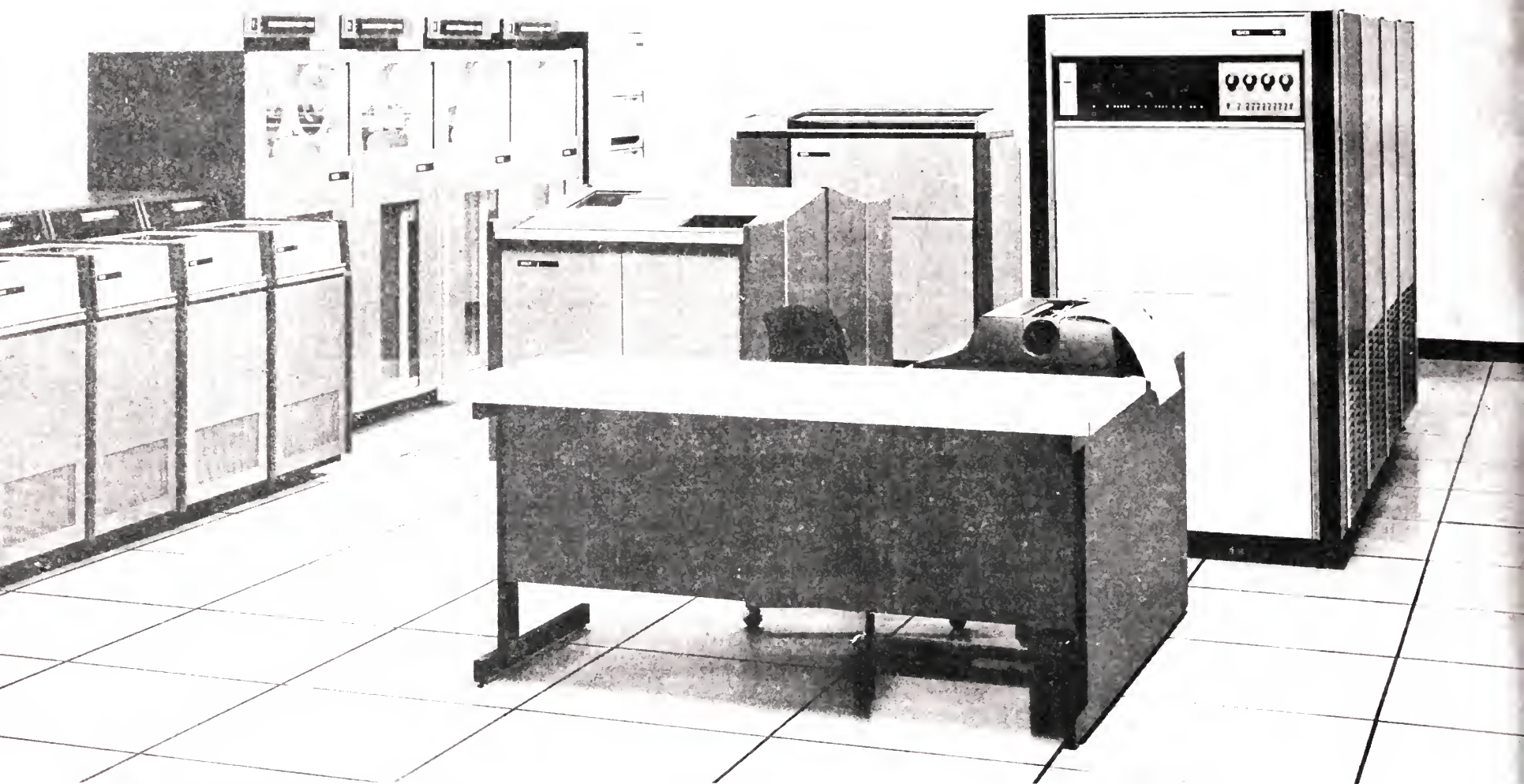
He cited a new formalized, structured, career pathing method for technicians and management personnel that gives a person a clear view of what to expect, and what is expected of him.

"You have to show the person visually what he has to do and what is expected of him," Osborn said.

W.E. Weeks, data processing manager for the state Department of Transportation, said California found the money spent on training extremely well-spent.

Louis Wayers, assistant to the manager of the Administration Information Services Department, Del Monte Corp., said: "Training is the most valuable aspect of developing personnel. We spend \$36,000/yr for EDP training and also encourage personnel to attend seminars."

**Xerox
announces
twins.**



The Xerox 560. All you need is one. Take it and run your whole outfit.

In an age of increasing specialization we present a brand new pair of 32-bit computers conspicuous for their versatility. The Xerox 560 and the Xerox 550.

The most advanced multi-use computers on the market today, these two systems represent a whole new generation of Xerox computers. New mainframes. New peripherals.

By taking advantage of the latest technology — microprogramming, LSI/MSI, and FROM — we've brought the size of the 560 and 550 way down, the performance way up. And the price below any comparable computers around.

Fraternal twins, the 550 and 560 each has its own special talents.

The 550's strong suit is real-time work — telemetry, simulation, communications. But with its decentralized architecture, the 550 can stay on top of its real-time duties while it knocks out batch work and terminal operations simultaneously.

The Xerox 560 is a multipurpose machine with a capital M. Utilizing Control Program-Five, it can do local batch, remote batch,



The Xerox 550. A real-time performer with plenty left over for batch.

time-sharing, transaction processing, and real-time jobs all at once.

Both the 560 and 550 are fast—including multiport 645 nanosecond memories. Virtual memory is standard. And expandable up to 256,000 words.

And they're both reliable. Thanks to the extensive use of integrated circuitry, modular construction and one of the most sophisticated diagnostic systems in the industry. Predictive maintenance and on-line diagnosis from our remote service centers are just two examples of why Xerox can offer such high system availability.

We'd like to tell you a lot more about the multitalented Xerox 560 and 550 computers. Give your Xerox representative a call.

Universities Take New Options

Educational Allowances Drying Up

By Molly Upton
Of the CW Staff

CINCINNATI — The glamorous days of the sixties are gone and the stingy days of the seventies are here for university DP centers, according to Dr. Robert Caster of the University of Cincinnati and director of the Southwest Ohio Regional Computer Center (Swoyce).

With tightened federal grants and decreasing enrollments, he explained, academic administrations are clamping down on computer equipment expenditures.

In addition, the discount by IBM to universities has decreased from 60% to 10% since 1966, he lamented.

"When you have over \$1 million tied up in software, it's pretty hard to jump" from one mainframe vendor to another, he noted.

Swoyce runs its PL/I programs on a leased 370/165.

Caster suggested that other vendors

should offer educational allowances. Thus IBM would be competing on equal footing with other vendors, rather than being hit by the Justice Department for its marketing methods.

Universities "truly have been the ones that suffered. If we could have made up the difference with another vendor, that would have been fine, but we didn't even have that option," he said.

"With the same budget dollars we're spending now we could have a much larger system under the old ground rules. We'd give a lot better service, a lot better turnaround, and we would enhance research. Now we degrade it," Caster complained.

The decline in educational allowance from IBM has made many universities "take options that we wouldn't have taken or did not have to take seven years ago," Caster commented.

"We've had to look at third-party leases,

foreign vendors that won't give us the same support but will give you seven-year marriages with hookers. In this type of technology, you can't afford to be locked into anything for seven years," he said.

Educational allowances have fallen off from other suppliers of terminals and modems as well. Now "we're treated the same as industry and the discounts are limited to large quantity purchases which we're not in a position to do," Caster ended.

IBM Key School Pacts Bared in Suit Memos

(Continued from Page 1)

contract he hopes in a few years that MIT will have with IBM a yearly business of \$10 million. He asked whether it would be possible at that time to reconsider raising the support level from \$1 million.

IBM's People

NEW YORK — In some cases IBM also had a hand in selecting the "right" people to man university computing centers, according to IBM documents introduced as part of the Learson deposition.

Herman H. Goldstine, in a memo to former IBM Chairman T. Vincent Learson, noted that he had recommended William Kehl, then director of the University of Pittsburgh Computing Center, to a position at MIT.

He was hired, Goldstine said, and would be joining the faculty of the center in the near future.

"Kehl is a good friend of ours and should materially change our relationship with the management of the computing center," Goldstine noted at a time when MIT had been going to some non-IBM equipment.

I told him that we would be delighted if our business went to \$10 million a year and that of course there would be no reason why he could not reopen the support level at that time."

Goldstine also noted: "I told Brown explicitly that we were out of patience with institutions which take our money and then go competitive. He said he not only understood but agreed with us."

In another case, Goldstine told Learson that Harvard University estimated its DP equipment expenditures were expected to rise from \$229,000/mo to \$865,000/mo over a five-year period.

"Potentially, all of this can be ours and I would like to be sure that it is," he said, suggesting that IBM renew a previous grant to the college for the next five years in order to help get most, if not all, of the business.

Another memo concerning Harvard's five-year computing program from R.W. Armstrong to Learson noted that Harvard was asking IBM for professional support that would cost IBM \$250,000/yr for the five-year period.

"Harvard's" (sic) objective is to obtain a close working relationship with IBM. To achieve such a relationship, Harvard is prepared to commit itself to IBM for the next several years," Armstrong added.

IBM 3340 Upgraded With Fixed Head

(Continued from Page 1)

were limited to 370/145s and up, and the 3340 fixed-head option is limited to the 370/135 and up.

User Pays

The price for the 3348 Model 70F data module is double that of the Model 70.

The 70F sells for \$4,400 and rents for \$165/mo or \$140/mo on the extended term plan.

The drive option, which is necessary to use the Model 70F, costs \$1,900 or \$47/mo and is field-upgradeable.

For the additional cost, however, IBM hedged on just what price/performance benefits would accrue: "Performance gains are dependent on many factors unique to each user such as CPU utilization, file organization, type of data and frequency of data usage allocated to the fixed head," a spokesman said.

"But generally speaking, improved performance could be realized through increased throughput, reduced response time or additional work load with no degradation," he added.

No benchmark data, however, is to be made available until the first customer shipment of these units in the third quarter, according to IBM.

Programming for the 70F should not be difficult, IBM said, but data set placement is required to gain maximum performance advantage, and this means modification of the Job Control Language to allocate frequently used data to the fixed-head cylinders.



We Get Along With Everyone

INCOTERM® SPD® 900 Remote Batch Terminal Systems are compatible with practically every major terminal . . . whether batch or interactive. This fanciful keyboard illustrates the point.



Not fanciful, however, is INCOTERM versatility. You can select 2780, 3780, and 2740, 360/20 and 2265, 1004 and Uniscope 100, 200 User Terminal and Series 710. Interface with a combination of service bureaus and CPU's.

Read cards at 150 or 300 cpm. Print at 200 or 400 lpm. Communicate at rates from 1200 to 4800 baud. Store up to 500,000 bytes on the optional SPD Diskette.

Use the SPD 900 for remote batch processing . . . and for order entry, remote job entry, file inquiry.

Call or write:

INCOTERM CORPORATION

6 Strathmore Road • Natick, Massachusetts 01760 • (617) 655-6100

INCOTERM Sales Offices:

Atlanta (404) 294-7588 • Boston (617) 655-6100 • Chicago (312) 593-2230 • Dallas (214) 634-2600 • Los Angeles (213) 640-0328
New York (212) 541-5780 • Orlando (305) 894-2605 • Pittsburgh (412) 921-4667 • San Francisco (415) 697-3643
Seattle (206) 682-7597 • Washington, D.C. (703) 524-8610 • Uxbridge, U.K. 31913-4, or London, U.K. 01-841-85-25

Actual Patient Care Use 'Years Away'

MDs Experimenting With Computer Decision-Making

By Alexander Dumas
Of the CW Staff

BOSTON — Using a computer to evaluate vast amounts of patient data quickly and print out diagnostic suggestions at the 95% probability level, several doctors at the Tufts University-New England Medical Center are experimentally double-checking their surgery decisions on complex kidney operations.

Until computerized decision-making is perfected, according to chief physician

The World of Medicine

William B. Schwartz, doctors performing these operations must lay out a traditional medical "decision tree" on a blackboard and assign numbers to each

treatment option. Using these numbers, the physician makes probability calculations that influence "life and death" decisions.

Although only one or two cases of every 100 treated have problems difficult enough to require statistical analysis, Schwartz said the calculations are complex and time-consuming, and the addition of a computer to the calculation process would be a "tremendous" asset.

Another asset, added team physician Jerome P. Kassirer, is computer consistency. "Although doctors know, or can be taught through experience how to make numerical decision analyses, they are sometimes too tired, too busy or too influenced by a recent case that turned out badly."

General Agreement

Schwartz stressed, however, it will be several years before the program or others like it will be tried in actual patient care involving the "life and death decisions." So far, experiments involving 18 "hard-to-diagnose" kidney cases show the computer and the specialists are on the same wavelength.

In 14 of the 18 cases, the Decsystem-10 agreed on proposed treatment and diagnostic tests. In the remaining four cases the computer and the doctors disagreed on treatment procedures, but Schwartz indicated the computer's choice was a "reasonable" alternative.

Schwartz sees the practical use of computer decision-making as five to 10 years away, explained the team's DP consultant, MIT electrical engineering Professor G. Anthony Gorry, because of the improbability of programming good old common sense.

"In any area," Gorry stated, "there's a tremendous amount of practical, real-world knowledge that a person possesses and doesn't even know he has. That's one of the areas where machines are weakest."

"In three or four years," he continued, "we could have a computer program that would be surprisingly good, but it could be incredibly stupid at times, because of the common sense 'hole' in its knowledge."

Group Practice

Gorry explained that the program for the kidney decision making was developed jointly with the doctors, combining their medical questions and treatment options with his knowledge of statistical computation. But to fill the "holes" in the computer's common sense department, more and more "inference" types of everyday situations must be added, he noted.

"Say a woman comes to a doctor and says she has swollen ankles. This could mean many different things medically, some of them serious. But if the woman qualifies her case by saying she is a full-time waitress, the doctor can almost immediately prescribe what to do."

"For a computer to diagnose a situation like this," he continued, "the program

would have to include pieces of non-medical data in order for the machine to use only relevant medical data it has stored."

Schwartz related this need for more computer common sense to complications when dealing with highly complex kidney cases. "If a patient with a kidney failure has also been hit by a truck, a computer might come up with ridiculous answers unless it is equipped to sort out the effects of the injury sustained by the truck injury from the problems caused by the failing kidney."

For the programs to be accepted for routine use, Gorry and the doctors believe the programs will have to undergo testing that will resemble the years of testing and certification now imposed on medical specialists. "We have a lot more work to do before this time," Gorry conceded.

Mini 'Beeps' When EKGs Change

BOZEMAN, Mont. — Because a nurse can't watch every heart patient's electrocardiogram at once, abnormalities and variations in a patient's heart beat might not be detected immediately.

To solve the problem two students at a local college developed a mini-computer-based system that monitors EKGs and "beeps" when the rhythms change.

Don Jones and Jerry Stolle, electrical engineering students at Montana State University here, said the hardest part of developing the system was writing a program that could distinguish between serious and minor heart beat abnormalities.

To do this the students used General Electric tape recordings of EKGs to determine the acceptable and unacceptable heart beat rates the computer would have to recognize as it analyzed heart rhythms. The students are presently recording EKGs of coronary patients in the local hospital to learn more about heart beat ranges.

"Many people think computers are replacing people," explained Jones, "but there is no way you can do this. Our minicomputer is an aid — something that keeps a record and makes a warning if necessary while the nurse leaves her station to tend another patient."

Think about it...



- you need sales figures on your top products as of this morning.
- you need inventory balances on key parts — right now.
- you need budget balances on several accounts today.
- you need the accounts receivable status on an important account now

THINK ABOUT IT . . .

- you have a communication device on your desk right now — the telephone.
- if your computer had a voice, you could call it and get the information you need.
- the computer terminals — your telephones — are already installed and paid for.

THINK ABOUT IT . . .

- the reams of reports you could eliminate . . . less than 10% of which are ever used.
- the countless interruptions that make for inefficient operations.
- the time lag you could eliminate.

THINK ABOUT IT . . .

THEN DO SOMETHING ABOUT IT.

You can make it all happen with Periphonics VOICEPAC 2000 Audio Response System. This revolutionary breakthrough gives your computer a vocabulary of up to 1500 words. Your telephone is your terminal. A very reliable one. A very inexpensive one.

If you knew what we have done for companies across the country, at a fraction of the cost you'd dream possible, you'd be knocking on our door. Why not let us knock on yours? Have your secretary send us the attached coupon — we'll respond at once.

DO IT NOW . . .

WHILE YOU'RE THINKING ABOUT IT.

Periphonics Corporation

Airport International Plaza, Bohemia, New York 11716
(516) 567-1000

☐ I'd like to know how I can make my computer talk.

Name _____ Title _____

Company _____

Street _____

City _____ State _____ Zip _____

☐ Have your sales representative call for an appointment

Send to **PERIPHONICS CORPORATION, DEPT. CW-4**
Airport International Plaza
Bohemia, New York 11716

The Computer Caravan welcomes:



as an exhibitor in The Spring 1974 Caravan.

Modular Computer Systems will demonstrate its measurement and control and communications capabilities in the MODCOMP II member of its real-time digital computer family. A complete, operating system will be on exhibit.

The Computer Caravan/74

sponsored by

COMPUTERWORLD

Washington • Cincinnati • Houston • Anaheim
San Francisco • St. Louis • Chicago • Boston
Charlotte • New York
797 Washington St. Newton, Mass. (617) 965-5800



DP Manager Salaries Outpaced By Rise in Their Employee Wages

By a CW Staff Writer

NEW YORK — While programmers and analysts are reaching record high salaries this year, their bosses' earnings remain relatively static, according to a recent survey.

Starting salaries of programmers and systems analysts in 1974 have set records, according to the annual Robert Half personnel survey, which is included in the Department of Labor's Employment Outlook series.

But at the same time, there was no increase for operations managers and DP managers in large corporations and only a slight increase for DP managers in medium-size installations, the survey showed.

Beginning programmers (less than one year of experience) in large companies started between \$11,500 and \$13,500 in 1974, according to the survey, up 13.6% from the \$10,000 to \$12,000 reported in the beginning of 1973.

Programmer analysts in large companies ranged between \$14,000 and \$16,000 in 1974, up 11.1% from the \$12,000 to \$15,000 reported a year earlier, while lead or senior programmers with a salary range of \$15,000 to \$18,000 only showed a 6.5% increase during the year.

Systems analysts ranged in salary from \$13,500 to \$15,500 in the large companies, an 11.5% increase over the previous year, while systems analysts managers increased 8.6% to \$17,000 to \$21,000, the survey reported.

However, operations managers remained at a plateau between \$13,500 and \$19,000 with no increase over the year-earlier period, and DP managers — whose salaries ranged from \$20,000 to \$35,000 — also remained in the same tax brackets as a year earlier.

Medium-Size Installations

In the medium-sized installations, the salary level was lower in terms of dollars in the 1974 study, but employees here were showing larger percentage gains over the previous year.

Beginning programmers were up 12.2% with a range between \$10,500 and \$12,500; programmer/analysts with a salary of between \$12,500 and \$15,000, were up 12.2%; systems analysts rose 14.9% to the \$12,000 to \$15,000 range; systems analysts managers were up 6.5% to \$15,000 to \$18,000; operations managers showed an 11.5% rise to the \$12,500 to \$16,500 range; while DP managers with a salary of between \$16,000 and \$22,000 showed only a 2.7% increase over the previous year.

In the smaller installations, the salaries were once again lower in actual dollars, and apparently were rising about on a par with the other two groups.

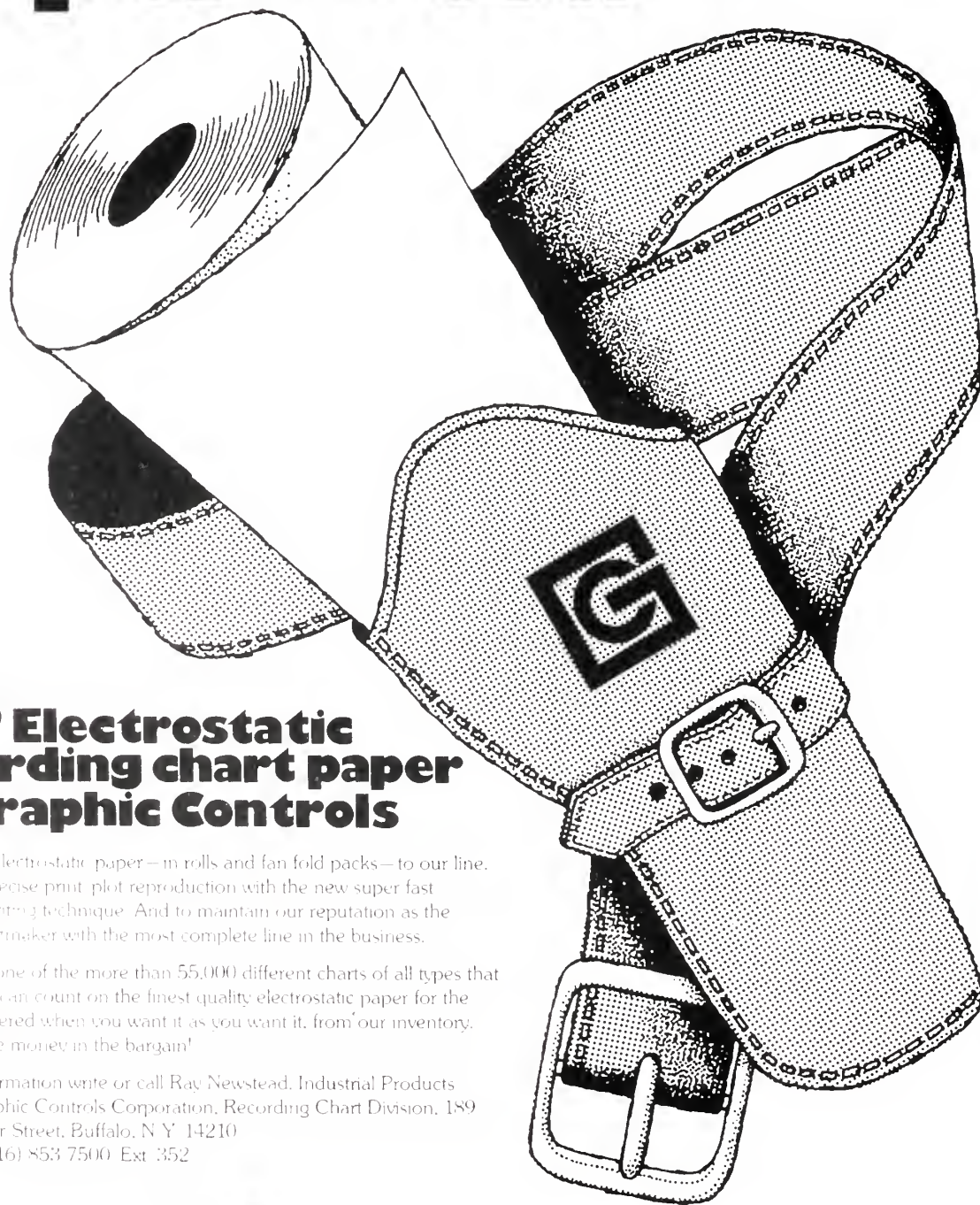
Beginning programmers here made between \$9,500 and \$10,500, an increase of 11.1% over 1973; programmer/analysts made \$11,500 to \$12,500, up 9.1%; systems analysts made \$11,500 to \$13,000, up 11.4%; and DP managers made between \$14,000 and \$16,000, an increase of 7.1% over the previous year's figures.

In all the lower-level programming jobs, the study said, 5% should be added to the average salaries for people with undergraduate degrees, while it said a 10% factor should be added to the salaries in higher-level positions for people with graduate degrees related to DP.

In all cases, the study found jobs that required substantial travel also rated a 5% additional salary over the average figures.

Robert Half Personnel Agencies is at 330 Madison Avenue.

Fastest recording paper in town!



New! Electrostatic recording chart paper by Graphic Controls

We've added electrostatic paper—in rolls and fan fold packs—to our line. To give you precise print-plot reproduction with the new super fast electrostatic printing technique. And to maintain our reputation as the recording chartmaker with the most complete line in the business.

As with every one of the more than 55,000 different charts of all types that we make, you can count on the finest quality electrostatic paper for the purpose. Delivered when you want it as you want it, from our inventory. And you'll save money in the bargain!

For more information write or call Ray Newstead, Industrial Products Manager, Graphic Controls Corporation, Recording Chart Division, 189 Van Rensselaer Street, Buffalo, N.Y. 14210. Telephone (716) 853-7500 Ext. 352.



RECORDING CHART DIVISION
GRAPHIC CONTROLS CORPORATION
189 VAN RENSSELAER STREET BUFFALO, NEW YORK 14210

Women Inmates Put DP Training to Use

MARYSVILLE, Ohio — Inmates at the Ohio Reformatory for Women here are being trained as data entry clerks and are putting their skills to work inputting material on traffic violations for the highway safety department.

The program, established by the Ohio Penal Industries Department of Rehabilitation and Correction, includes a week in a general education program and five hours a day on Consolidated Computer, Inc. Key-Edit machines.

Women spend about 25% of their time learning to operate the system and the other 75% keying traffic violation information.

A feedback device allows the women to see how well they are doing and to compare their efforts with others in their class.

The first group of graduates has passed the Ohio State Civil Service exams and several former prisoners now hold DP-related jobs.

"The employment possibility is quite high," observed a prison spokesman.

Rise in Use of Robots for 'Dirty Work' Causes Concern Among Labor Unions

Special to Computerworld

CHICAGO — In order to cope with a future shortage of unskilled manual laborers willing to perform repetitive and dangerous manufacturing tasks, U.S. industry will be turning increasingly to automation or robotization of such tasks on the factory floor.

However, such moves will be accompanied by problems that are more of a social than technical nature, including union problems, according to researchers looking into the area.

The U.S. manufacturers' move into the field will follow the lead of a number of European countries and Japan, which are already experiencing a tight labor market in low-level job categories, according to Dennis Hanify of the IITRI Robot Research Institute (IITRI) here, which has instituted a special academic program in the area.

Hanify said the development of robotization technology in Europe and Japan, while presently lagging behind the U.S., is increasing at a more rapid rate. He predicted greater interest in the field domestically as the U.S. population levels off and it becomes "difficult to find people who want to do these dirty jobs."

Hanify also pointed to increasing cost-effectiveness, brought about by rising labor costs, and increasingly stringent Occupational Safety and Health Administration work rules, as spurs to utilization.

Auto Makers at Forefront

In industrial manufacturing categories, auto makers have taken the fore in implementation of robot process techniques, Hanify said. Among European auto manufacturers, Mercedes, Volkswagen, Peugeot and Citroën have converted some of their assembly line operations to robot control, and Japan's Toyota is moving into the area.

Labor's view of adoption of robot equipment, with its potential for displacement of union members, is a point of contention.

Hanify said United Auto Workers officials have participated in robotization seminars and symposia, and he mentioned union officials' concern that "their people be given the job of controlling the robots" in plant conversion situations.

A UAW spokesman in Detroit said his group "in a broad sense... never has opposed computerization. What we're concerned with is the effect of robotization on the UAW worker." He cited the General Motors plant in Lordstown, Ohio, where the union raised no objection to the installation of 26 to 30 robot systems, "as long as there was no increase in the work pace."

But since Lordstown was a new facility and robotization there posed no threat of displacement of existing UAW jobs, it was an unusual case, the UAW spokesman indicated.

In plants where robotization raises the possibility of supplanting union members, he said, "We handle it on a case-by-case basis." He said it was the union's policy to "insist on prior consultation" before implementation of robotized systems, in order to work out union concerns and protect members' interests.

IITRI has formed a technology center for manufacturers contemplating the move into robot technology. The Industrial Robot Analysis (IRA) program will be a multiclient effort providing input

from computer technology, machine system design, management science and other fields, Hanify said. IRA, to be directed by the IITRI Robot Technology Center, will be aimed at companies new to the field who haven't yet explored the

The Second Industrial Revolution

costs or possible benefits of robotization, he noted.

Help Neophytes

Hanify said one purpose of the program would be to help neophyte manufacturers avoid a repeat of "the computer syndrome, where everybody ran out and bought one, whether they needed one or not."

A major consideration in a decision to move to robotization is cost-effectiveness, he explained, noting that robotization of a single manufacturing operation may run as high as \$100,000 or more.

TELEX V, IBM APPEAL ANALYSIS

Full Text of:

- Judgement, Findings of Fact and Conclusions of Law in District Court
- Amended Judgement, Findings of Fact and Conclusions of Law in District Court
- IBM Brief on Appeal
- Telex Brief on Appeal
- IBM Reply Brief on Appeal

Plus Special IDC Analysis of Briefs and Issues on Appeal including

- Summary of Each Brief
- Summary of Issues
- Court of Appeals Decision Alternatives and Probabilities
- Analysis of Legal Precedents
- Analysis of Legal Arguments

Distribution Date 5 working days after filing of IBM reply brief (about March 29, 1974)

Price: \$300

To: Legal Research Department
International Data Corporation
60 Austin Street Newtonville, Massachusetts 02160

ORDER FORM

Gentlemen: Please send me the TELEX v.
IBM APPEAL ANALYSIS package.

Name _____

Company _____

Address _____ Zip _____

☐ Payment enclosed ☐ Bill me

**If the food for
your super
computer is being
harvested
by hand,
you don't have
two problems... you have three.**



one

At the computer.

Your supercomputer is only paying for itself when you're using it — so getting data into the system to be processed is critical to your operating costs. MSI's Field Data Entry Systems streamline the data collection and transmission processes and therefore facilitate regular scheduling of inputs.

two

Paper and pencil.

Collecting data with a clipboard or some similar means is slow, tedious and time-consuming work, and the resulting handwritten data is readily misinterpreted. MSI's Portable Data Entry Terminals quickly, easily and accurately record either numeric or alphanumeric data on tape cassette or in solid state memory while personnel remain mobile in their work activities.

three

In between.

Handwritten source data must be handled and translated several times before it can be processed — which significantly increases the incidence of error. MSI's Field Data Entry Systems eliminate the unnecessary steps of clerical data handling, keypunching and verification, and replace mail, truck or delivery service with direct transmission of the source data via an ordinary telephone call within minutes.



MSI
DATA CORPORATION

340 Fischer Ave., Costa Mesa, Ca. 92627

MSI CAPTURES DATA AT THE SOURCE IN COMPUTER-READABLE FORM.

FOR SALE

360/65 J with
7080 Compat., (2) 2365-2,
2860-3, 2870-1, 1052-7

Available Now

Contact D.R. Tebo
(315) 474-5776

Editorials

Export Curbs

Computerworld agrees with the reported recommendation of an industry technical advisory committee that peripherals such as 360-level tapes, disks, add-on core, printers, readers and punches be exported freely to Communist countries. Putting aside the favorable effect on vendor sales, we believe the helpful push that is given to the balance of trade, the opportunity to "show the flag" in markets where Coca-Cola and TV westerns do not penetrate, and, above all, the suppression of some of the Eastern Bloc urge to set up their own production, all warrant elimination of current restrictions.

We continue to oppose export of high-level technical know-how, in the advanced peripherals as well as in the CPU and chip technology areas. This is more a matter of industrial position for the future, rather than of national or international military security. As customers, always assuming they pay in real goods — gold, platinum, oil, sables and caviar — our Red neighbors are useful. Let's not help them to wander off or to compete with us in the Third World.

The Human Cop

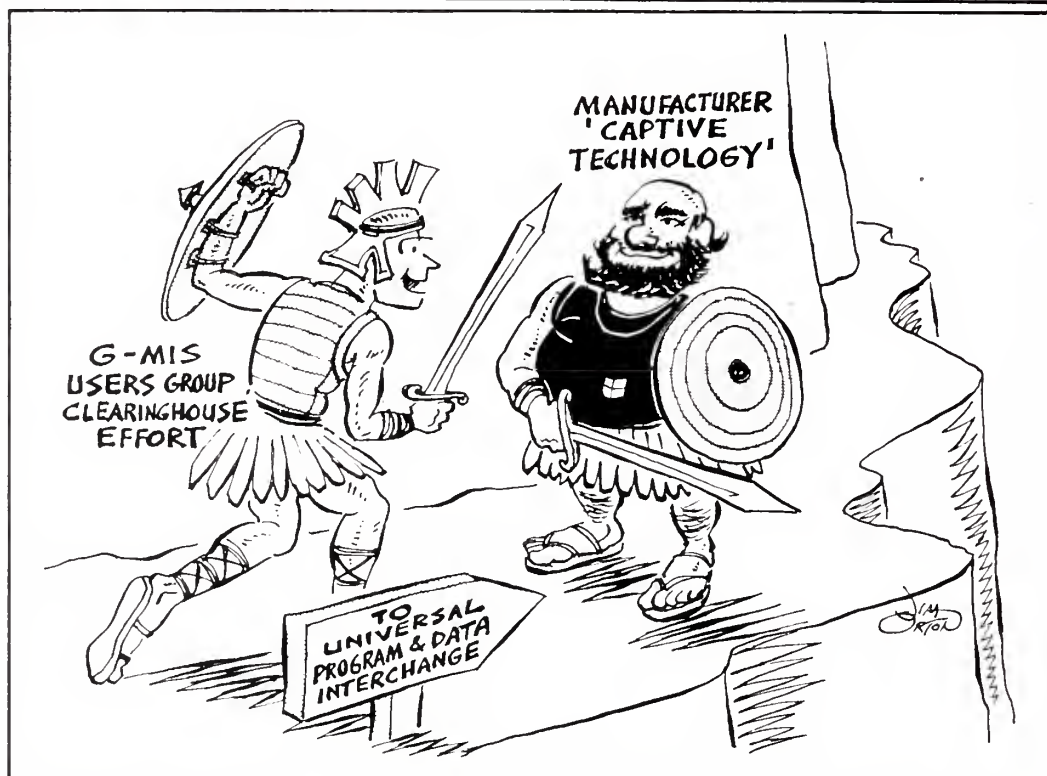
At a time when the top law enforcement officers of the land were in Washington, D.C., arguing that control over computerized criminal histories should be left entirely in the hands of the police, a story that Massachusetts policemen may have been selling such records underscored the need for some agency to oversee the police operations.

Both Attorney General William Saxbe and FBI Director Clarence Kelley argued for police control over the systems, opposing a measure that would establish an independent civilian board to oversee their use.

The Massachusetts case, however, underlined the importance of such a review, since the initial evidence of possible illegal use of the records came from an audit of the system performed by a civilian group.

Kelley and Saxbe apparently feel that police agencies and police personnel are inherently more trustworthy than any civilian board could be.

Unfortunately, this is not so. Policemen are human and subject to the same inducements and foibles as other citizens.



En Garde!

Letters to the Editor

Justice Under Law, Justice for All?

Re March 13 editorial:

Your argument in favor of computerized, hence uniform, judicial procedures is a good and necessary one. But your examples certainly do not help to support it. A system which uses only the "magnitude" of a crime (let alone its emotional impact — murdering women and children is not legally a more severe crime than murdering able-bodied men) to determine bail seems no more equitable nor uniform than the totally subjective methods now used.

Many other factors (e.g., previous criminal record, likeli-

hood — based on age, public standing, character references, past appearances, etc. — of appearance at a later date, ability to pay) must also be considered and weighted appropriately.

Paul Bent

Long Beach, Calif.

Small Systems Story Said to Favor IBM

Re "Small Systems Users..." [CW, March 27]: Equal Time Please!

I found this article most unfair, especially to Burroughs and NCR. Like any other vendor they have problem sites but they also have many satisfied users. I'm sure your staff is aware of this as it probably bypassed many happy users in its quest for the dissatisfied users portrayed in this article.

As an NCR Century 100 user for two-and-a-half years I am very pleased to say we are more than satisfied. As a matter of fact, due to increased volumes we have decided to upgrade to a Century 101. It's nice to know that the programs we are now using on the Century 100 can be run on the 101 with no repro-

gramming required. This upward compatibility feature is a big plus. Have you ever tried to upgrade from a System/3 to an IBM 370?

A newspaper as well read as *Computerworld* influences many people in the computer community, as you know. Therefore, I think it is very important that CW articles be more unbiased and tell it like it is. Your pro-IBM attitude has always been somewhat of an irritation to me as I'm sure it has to many other non-IBM users.

So, unless you are going to change your logo to say "Computerworld, the Newsweekly for the IBM Computer Community," let's hear both sides of the story.

Ms. Evelyn Forrest Thomas
Manager

Data Processing Department
Intercounty Construction Corp.
Hyattsville, Md.

Many readers accuse us of anti-IBM bias. Your opposite view is refreshing.

We'll be glad to have another letter from you, or a story, about that easy upgrade. Afterwards! HG

A Wall up to the Sky

An editorial in this issue rather conservatively expounds *Computerworld's* position on selling hardware to the Reds (we're for it), building chip factories for them (we're against it), and showing them how to make good electromechanical gear (we're not enthusiastic).

But there are mutterings in Washington of Old Pentagon ugliness to come. Years ago I was an official member of a committee that advised the Office of Export Control of the Commerce Department on the technical aspects of computer export decisions. Sid Fernbach was also a member, and has survived Nixonian vicissitudes to perform a similar function in present-day advisory activities. Faceless types from State and other concerned departments were consistently browbeaten by dastards from DOD. I was disinvited after challenging an Air Force light colonel to tell us where he got his orders, DDR&E (John Foster) or International Security Affairs (Warren Nutter), permanently disinvited!

Ancient history: I bring it up again because of a rumor CW has picked up that the White House, and Peter Flanigan in particular — the last, and always one of the least attractive, of the Haldeman/Ehrlichman Mafia — is promulgating new computer technology export restrictions.

The very thought that a grisly type like Pietro is in on the act is enough to make one's flesh creep. But, far worse, we hear that there is an intention to restrict tech-

nical knowhow, technical data and technical publications. That would presumably be IEEE-CS journals, not *Computerworld*. But in any case, I'm screaming, and will scream louder when I have some facts.

Two problems: first, the intent is to restrict distribution of technical information not only to the Russians, but to countries and organizations that might in turn transfer it to them. That's just about everybody but the Portuguese!

Second, and much more important, the whole thrust of the concept is wrong. You can't classify science and technology: somewhere in Mainland China a mute, inglorious Newton is reinventing Josephson. Even in Albania! You can't wall off our competitors from the universe, nor us from the rest of the world.

Engineers of the world, unite! You have nothing to lose but your Flanigans!



Herb Grossh



"We Wondered . . . Could You Slip Us to the Computer and Tell Us Exactly Where We Stand in All Aspects of Our Positions Here, Our Credit Ratings and Future Prospects."

Professional Practices

A Totality-of-Agreement DP Contract Usually Isn't

By Thomas K. Christo
Special to Computerworld

Probably the most common type of provision in any data processing contract is the "totality-of-agreement" clause. It is also commonly found in later arguments about whether promises have been fulfilled, with the user apparently being put in a difficult position unless he can show in the contract exactly the promise he claims has not been kept.

With the standard printed form contract he often can't do this — but this does not necessarily mean he can't recover for any valid claims he may have.

The principles are the same for users who rent or buy computers just for their in-house work — but they are slightly easier to illustrate where outside damages are involved.

Simple Simon

Take, for instance, the case of Simple Simon, a would-be user, and Donald Decept, Inc., a large hardware vendor. Simon has a credit-card application to attract customers needing on-line capability which he did not have. Decept advertised its F-127 system in *Computerworld* extolling its communication and on-line virtues.

Simon contacted Decept, and was told by both its salesmen and technical support people that "our F-127 is uniquely suited to credit card applications, such as those that you are developing. It can give

you five-second turnaround with a reliability factor of 0.01%." The salesman further stated that Decept's existing library of software could cover the application nicely.

Later, after agreement on lease/purchase

The Professional Practices Page is coordinated by Alan Taylor and the editorial department of *Computerworld*. Suggestions for articles should be sent to the Professional Practices Page, *Computerworld*, 797 Washington St., Newton, Mass. 02160.

terms, Decept's legal department drew up a contract regarding the hardware, extra charges for furnishing to Simon "such software as may be available from time to time," and a totality-of-agreement clause, saying the agreement was complete, and could not be orally altered.

Great Expectations

Later, after considerable effort and hundreds of man hours, conversion was completed with the help of Decept's technical staff, a credit card customer was signed, others were waiting in line — but the system did not fulfill its promises. Turnaround time was over 25 seconds — reliability was only 10% — and the software was unsuitable.

Simon's customer started suing, the prospects went elsewhere — the bills for the F-127 were coming in from Decept and were much higher than those for

Simon's previous batch system, and everything generally looked bad.

In particular, the Decept-Simon contract looked bad, for it did not mention turn-around time or reliability matters, just a set of hardware specifications. And with the totality-of-agreement clause, it looked as though Simon had traveled down the tunnel of conversion to a new system and had been left with nothing but the shaft.

In fact, Simon, however, had still several options open. These included:

- He could argue he was fraudulently induced into the "complete agreement" by virtue of the blatantly false representations made to him, and the fact that they concerned points which could be said to be in Decept's knowledge. However, Decept could respond that the contract was clear, and that if Simon wanted something else in, then he should have had it put in (pacta sunt servanda — contracts will be observed.)

Simon has a possible counter here because Simon was agreeing to the purchase of hardware on a lease plan — not an agreement to limit his relationships with Decept to this one contract.

Although the contract does not mention it, Simon could bring evidence about the amount of conversion support provided to show he hadn't bargained his freedom to make other contracts — and then produced more evidence to show what were the real agreements between the parties.

- If, however, Simon could not prove fraud, he could still introduce outside evidence to show, supplement or explain his contract. He thus could attempt to show what he actually bargained for was a system with a particular application and particular performance requirements (Uniform Commercial Code Sec 2-202).

- Alternatively, he might introduce the supplementary evidence to support a claim of breach of warranty of fitness for a particular purpose (Uniform Commercial Code Sec 2-315), asking both to cancel his contract and to obtain damages.

- If none of the above points worked, there would still be the theory of an implied contract to supply software for on-line credit card applications. (E.G. *Murray vs Cunard Co.*, 235 N.Y. 162 (1923)). Such a contract, if it were breached, could mean the award of damages, including the cost of the now useless lease-purchase contract.

In short, just because a contract states it is complete does not stop valid claims of relief which an aggrieved party seeks to raise. If most contracts with the totality-of-agreement provision were really complete, they would be a lot more used than they usually are now.

The article is not intended as a guide in any specific case.

(Thomas K. Christo is a member of the Massachusetts and First Circuit Federal bars.)

CLA Facing Up to New Questions on DOS Support

The independent DOS service that started about a month ago for DOS users of Computer Lessors Association-leased machines is a clear success. The DOS support staff has been receiving about a dozen inquiries a day and has been solving about 90% of the problems, according to

The Taylor Report By Alan Taylor, CDP



of the problems, according to Jerry Enfield, leader of the DOS support team. The volume has indicated a real need continues to exist, and that a centralized staff can both effectively and economically cope with most of it.

Other calls and letters, however, have brought up some questions that Enfield cannot answer. One I received from a New Jersey reader, T. Minero, seemed to be a simple question asking how he might avail himself of the service. It turned out to be unanswerable because currently there is no way for him to obtain the service. It is exclusive to the users of CLA machines — and even they cannot guarantee its continuation because it is currently undergoing a three-month trial, with no agreement about future operations.

Minero's question, while apparently unanswerable, turned out to have an answer, although not the one he might have expected. The answer seems to be for him and others like him to describe what sort of a service DOS users would value.

This column is therefore an invitation to readers to provide the input needed to define the availability and terms of such a

service. The invitation incidentally is not really from me, but from Michael Creedon, who as president of CLA has a great deal to do with the usefulness of any answer.

Creedon aims to get out an answer within 30 days of the request, which is pretty fast when you consider you are dealing with a 14-member organization. From Minero's position it means both a reasonable time-frame is possible, and that therefore it is necessary to understand the CLA position before asking it any questions.

Here is the CLA position as I understand it. The CLA is a group of leasing companies which over the past few years have come to realize they have to provide more user support, and which have a large number of systems for which they have paid IBM's full retail price, amounting to over \$2 billion.

Support, they have found, costs money, and if an individual company or group of companies charges too much for supporting the systems it ends up losing customers, not because the support is not worth the money, but because the prices of other competitors — other leasing

I read with interest your recent article describing the Computer Lessors Association's DOS support service.

Could you possibly furnish me with additional information regarding how we might avail ourselves of this service, including whom to contact, costs involved, etc. T. Minero, director of data processing.

The letter seemed unanswerable, as the DOS service is only available to CLA members. But an answer was possible.

companies which may or may not be CLA members or computer brokers which do not provide such support — are more attractive to new customers.

Computer users, the lessors find, are also broken down into groups. The CLA members' real aim must be the maintenance of the value of their own inventory — and so they would, on the surface, be best served by supporting an exclusive market, where only CLA members are able to support DOS users.

Certainly, when it comes to the question of providing support to customers of other leasing companies there would be strong words spoken at the CLA board meeting, and the whole program of providing joint support might be lost.

Yet, there are other computers to take into account. Many users have purchased 360s, so support to them cannot be regarded as being direct support to competitive leasing companies. And the current situation appears to be that the need exists, that CLA has the capability, and that the success of the DOS support program to date and the request for its expansion suggest there should be some way around the problem.

So that is where the readers can help by suggesting ways in which support in this area (and by implication in other areas later) can be organized. Your suggestions are valuable, because while CLA has input from its members, it does not have good contact with the outside areas, which is exactly where the support may be needed.

Some of the possible questions are:

- Should support be available on a "per call" basis? Or should it be restricted to an annual premium basis?
- Should it cover both maintenance of understanding of old

problems, with answers — or should it include provision for new research? Should different prices be charged for such services?

- How should new developments be handled? Should they be excluded from the range of the service and allowed to be marketed separately?

- How can both the CLA need for a competitive edge and the user need for the best available support be reconciled?

If you think of other questions and send them to me, I will see that CLA has the advantage of your input — and that reader Minero gets the answer to his question just as soon as possible. Like him, I think the sooner the question is answered the better.

© Copyright 1974 Alan Taylor. Reproduction for commercial purposes requires written permission. Limited numbers of copies for non-commercial purposes may be made provided they carry this copyright notice. The views expressed in this column do not necessarily reflect those of *Computerworld*.

Input for CLA DOS Decision

The Computer Lessors Association has recently started what appears to be a useful telephone and computer-based support service for DOS users. Such a service is not available elsewhere. It is financed by CLA members to help maintain the value of their inventory of IBM System 360s. Requests for the expansion of the service to other 360s — not owned by CLA members — are now being received and being considered by CLA.

Under these circumstances

(1) Should CLA respond positively to such requests?

☐ Yes ☐ No

Please explain your answer

(2) How should CLA members protect their own interests?

(3) What value would you put upon a DOS support service?

(a) On a per-call basis ☐ \$10 ☐ \$25 ☐ \$40 ☐ \$60

(b) On a prepayment basis (of rental)

☐ 2 ☐ 4 ☐ 16 ☐ 8

(4) Would you be interested in obtaining DOS support service, if it becomes available? (Do not answer unless you run a DOS installation)

☐ Yes ☐ No

Comment

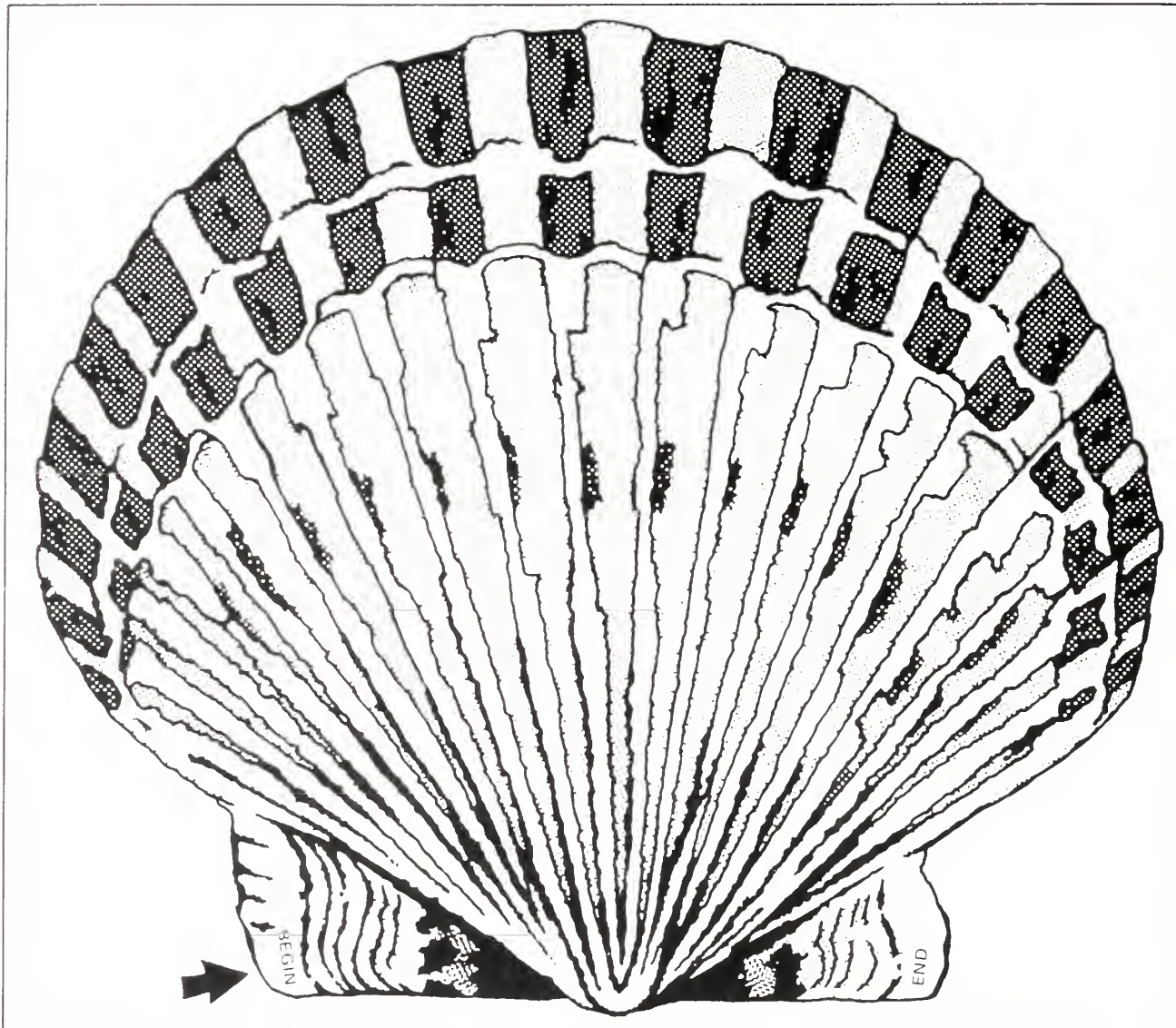
Name

Position

Address

Please return to Alan Taylor, Taylor Reports, c/o Computerworld, 797 Washington St., Newton, Mass. 02160.

WHILE YOU'RE TRYING TO SOLVE THIS PUZZLE . . .



LET US SOLVE YOURS.

If you have the problem of developing your company's accounting systems, we can help.

Instead of expensive and time consuming custom development, INFONATIONAL provides GENERAL LEDGER, ACCOUNTS PAYABLE, ACCOUNTS RECEIVABLE/SALES ANALYSIS, or FIXED ASSET Systems that fit your needs now.

Call or write today. Solving your systems problems is our business.

INFONATIONAL

THE FINANCIAL SYSTEMS COMPANY

WE'VE GOT THE ANSWERS

Boston (617) 339-1111 Chicago (312) 339-1111 Dallas/Forth Worth (817) 732-6603 New York (212) 339-1660
6626 Convoy Court, San Diego, California 92111 (714) 560-7070

Library Access Must Be Secure

TORONTO — One way to determine the security of a computer system is to check it against the following security "musts" concerning library procedure:

- Limit access to the library by keeping the door locked at all times or by assigning a full-time librarian, or an operator after normal working hours, to monitor access.
- Prohibit programmer access to production tapes or disks or documentation without written authorization.
- Maintain a log of programs and data files in the library.
- When not in use, store all programs and data files in a locked safe or cabinet whose locks or combinations are changed periodically.
- Instruct the librarian to release programs and files only when computer runs are authorized and scheduled.
- Have the librarian record the return of programs and files after computer runs, thereby providing a record of their usage and a cross-reference between tapes or disks and computer runs.
- Establish special stringent procedures for obtaining sensitive files from the library.
- Use tape reels and disk packs which have special labels which can be detected by a sensor in order to prevent theft.

This checklist was compiled by DCF Systems Ltd., 74 Victoria St., Toronto, Ont. M5C 2A5.

County Turns to DP To Combat Shortages

ST. LOUIS COUNTY, Mo. — This county's purchasing department will soon be using a computer program to alert it 90 days before its commodity supply contracts end, leaving the county time to do a thorough bidding and evaluation process.

The system will be especially important in dealing with hard-to-find gasoline, paper and road building material supplies, according to Kenneth Vaughn, county DP director.

The program, presently in the system design stage, will provide both periodic reports and on-line inquiry and response capability via IBM 2260 CRTs.

Initially the program will respond to contract ending dates or a set limit on reorders. Later the program will tie into an inventory system.

Vaughn said the Cobol program will take between 50K and 60K on an IBM 360/40.

SWITCH NOW!

Trendata Model 2000 Polling
and Addressing Station replaces
IBM 2740-Model 1 or 2741

Write or call
for full information



trendata

An Applied Magnetics Company

610 Palomar, Sunnyvale, California 94086 • (408) 732-1790



Direct replacements for IBM 2740/2741 terminals

- Enhanced performance at lower cost
- Rugged and reliable, with **heavy duty** I-O type Selectric
- Human-engineered for operator comfort and efficiency
- Fully plug-compatible with IBM
- Prompt delivery (30 days)
- Backed up by nationwide service
- Built-in dual switchable modems (optional)
- Optional copyholder, work area, utility shelves
- Acceptability proven by many major accounts
- Switch for operation either as 2740-Model 1 or 2741

What's Real About VS?-Part I

'Significant Operational Advantages' Seen Over MVT

By Dr. Bernhard W. Romberg
Special to Computerworld

We think IBM's VS systems environments may be thought of as "oversold," or "depressed." This is unfortunate, since the VS systems can provide significant operational advantages and certainly seem to be the basis for the long-term product plans of IBM.

One of our clients, "Alpha Manufacturing," was operating a substantial DP facility, with multiple 65s and 2314s. Alpha was generally well-satisfied with the cost-effectiveness of its configuration, but

This series has been extracted from a report evaluating IBM's VS, prepared by and available from ADL Systems, Inc., Acorn Park, Cambridge, Mass. 02139.

foresaw considerable growth in its workload largely through new applications, many of which were to be of an on-line nature. (Most of its present work was batch-oriented).

Alpha wanted an equipment plan which would consider alternatives such as:

- Should it expand simply by adding 65s?
- Should it replace the 65s with 158s and possibly look toward a 168?
- If it was to go to either a 158 or 168,

which operating system should it use?

- What should be the general timing of the equipment changes?

Factors to be considered were costs, flexibility, disruption and others. Decentralization, with a possible second site for security purposes, was also an important consideration.

Gross Data

We decided to use very gross benchmark data. Some benchmarks had been run by Alpha, but we also made extensive use of other "data," based on benchmarks run by others. We normalized all this data so that it expressed a "relative capacity" of two CPU-operating system combinations and found the ratio of capacities is essentially the inverse of the ratio of running times.

We compared various configurations all operating under MVT, and certain other configurations under VS2 with configurations under MVT.

We examined in detail certain of the benchmark tests, to obtain a better understanding of the types of file accesses and general I/O activity, the degree of multiprogramming, the general structure of the jobs being run, and the general magnitude of the tests. One can take exception to both the approach and the

(Continued on Page 17)

RDOS Backs Multiterminal Use, Clustered Nova Software Linkup

SOUTHBORO, Mass. — Data General's Real-Time Disk Operating System (RDOS) has been enhanced to include software interconnection of as many as 15 Nova-line minicomputers. The company previously had hardwired interconnection capabilities.

The revised operating system also features a communications package that lets an operator monitor and control the execution of tasks within a program. A multiterminal editing facility that permits up to 16 simultaneous users to work with programs or data files on each processor is also now part of RDOS.

Program Suspension

For users of the Nova 840 in particular, RDOS also includes a checkpointable background capability that can temporarily suspend one program so that another can be run.

Functionally, RDOS Revision 3 sets up communication links among Novas that are connected through Direct Memory Access channels, allowing processor-processor data transfers with minimum overhead. With this support, Data General suggested, processors can be clustered with each doing a particular portion of the total DP job.

The combination of RDOS Revision 3 software and the S2,100 Multiprocessor Communications Adapter (MCA) also means that the Operating System generated for each of the clustered processors can be limited to just the features needed to accomplish that processor's assigned job. Such tailored software will, in turn, allow more room in each processor for the end-user programs or data files.

The operator communications package lets the system operator keep tabs on how well jobs are being done and then killing, or running tasks set for one-time execution, or queuing tasks for execution periodically.

The ability to support a number of terminals, each able to edit data or programs, is "essential," in Data General's view, for applications such as program development — where one copy of source statements keeps all developers aware of changes, or order entry — where new data is being entered and old data altered on a continuing basis.

The Nova 840 checkpointing facility allows priority jobs to be run in background as they are needed, interrupting but not aborting whatever was running when the rush work arrived.

Sys. A	158 (2314)	158 (3330)	165 (2314)	168 (3330)
Sys. B				
65 (2314)	1.1	1.26-1.72 (3 tests)	1.8 (2314) 2.1 (3330) 3.06	1.81
155 (3330)		1.0-1.84 (8 tests)	1.84 1.91	
158 (3330)				1.95
165 (3330)				1.13-1.32

Sys. A	155II	158 (2314)	158 (3330)	168 (3330)
Sys. B				
65 MVT		1.41	1.23 1.30 2.38	2.23 2.40 4.00 (2314)
155 MVT	.91 .97	.95-1.79 (9 tests)		2.67 2.32 2.99
158 MVT			.85-1.15 (9 tests)	
165 MVT				1.03-1.83 (7 tests)
168 MVT			71	.88-1.60 (7 tests)
158 VS2/R1				1.54-2.68

In each chart above, the "effective capacity" of System A is compared with System B, rated at 1.0. Each System A configuration in the right-hand chart was under VS2/R1.

Benchmarks

ADL Systems found this comparative data on TSO operations running under MVT and under VS1.

TSO Benchmark Results				
155 MVT			158 VS2/R1	
Number of Terminals	Trans/Min	Response	Trans/Min	Response
30	44	2.6	45	1.9
40	57	3.7	52	2.3
50	65	6.8	74	2.8

'AVR-Plus' Eases DOS Operations

DANBURY, Conn. DOS/360 users can process a job stream in any partition without changing JCL assignments, if the system software includes the AVR-Plus enhancement package from Universal Software, Inc.

AVR-Plus includes automatic volume recognition and "device equate" capabilities that prevent conflicting I/O assignments, and eliminate the need to maintain duplicate JCL for each partition, the company explained.

The new package facilitates scheduling procedures and minimizes operator intervention. The automatic volume recognition facility allows the user to make assignments to a volume serial number rather than to a specific device.

After reading the JCL, AVR-Plus scans the tape or disk drives for the specified volume and makes the required assignments dynamically. This avoids "Wrong Pack"-type messages and allows the operator to mount tapes or disks on whatever device is available, eliminating the "clerical" effort of matching data set to particular unit.

The Device Equate facility permits the user to establish a table which identifies device assignment relationships for each partition. This table resolves conflicting I/O assignments between partitions for unit record, tape and disk devices, and solves the problem of having devices stand idle (because they've been assigned to a particular partition) while a job is

delayed because properly assigned units aren't available.

AVR-Plus is available for a three-year license, at a cost of \$1,200, or for \$90/mo rental. It is also available in combination with the separately priced DOS Asap spooler package, for \$750, a company spokesman noted.

Universal is at Commerce Park, 06810.

Xerox Processors, Peripherals Linked

ANAHEIM, Calif. Computer-to-computer communications and sharing of peripherals between two Xerox processors operating under BCM, RBM or CP-R are made possible with the Dual Processor Software (DPS) package from Code Research Corp. (CRC).

DPS allows the satellite to access the host's peripherals in a way that is transparent to the satellite user. When the satellite is used as a preprocessor for data or a control processor for work done within the host, the transfer of data between computers is possible.

CRC modifies the basic DPS software to fit the user's operating system. Prices for the package are in the \$8,000 to \$13,000 range, depending on the tailoring required.

CRC is at 1363 S. State College Blvd., 92806.

VALUE COMPUTING
PUTS YOU IN CONTROL
OF YOUR
COMPUTER OPERATIONS

VS Scheduling is just one way.



Because it replaces confusion with confidence, speculation with specific answers for the IBM user who moved to VS, and now is not sure just what he might have gotten himself into.

Not that this new innovation in memory utilization is just a lot of VS, but sometimes the hoped-for benefits are replaced by job run-time stretchout, missed due-out times, system overhead degradation, thrashing, ... and second thoughts

But think about VS Scheduling from Value Computing. It builds, maintains and works from a sound data base to optimize the job mix, and control the power of the VS system. Allowing users to set maximum paging limits for the entire system.

It puts you in charge of your computer operation. Which is the right place to be. Another "right place" is Value Computing.

That's our name. ... and our goal.

VALUE
COMPUTING INC.

496 Kings Highway North
Cherry Hill, NJ 08034 609-667-8770

VALUE COMPUTING INC.
496 Kings Highway North Cherry Hill, NJ 08034

I'm interested in more details about
VS Scheduling.

Please send additional information.
Please have a salesman call.

Operating System: _____

Name _____

Company _____

Title _____

Phone _____

Address _____

City _____

State _____

Zip _____

10

**Ten years ago,
International Data Corporation
was a man and an idea.**

Today, Pat McGovern and his idea have grown into a family of companies, services and people, doing a hundred different things in countries around the world.

- International Data Corporation
- Computerworld
- Advanced Technology Publications
- The US Computer Caravans
- IDC Europa, Ltd.
- IDC Japan
- IDC France
- Computerworld, GmbH
- The International Computer Caravans
- Shukan Computer

Happy birthday to us.
And thanks to you for helping to make all this possible.



'C/PBS' Batch, On-Line Modules Support Order Entry, Inventory

WEST SIMSBURY, Conn. — Manufacturers, distributors and chain and single store managers can improve product turnover, reduce costs and gain better control of their operations with the Customer/Product Based System (C/PBS) from Computer Covenant Corp.

The order processing and inventory management package, written in ANS Cobol for 360/370s, is designed to provide better customer service levels and to perform product forecasting and support management generally in its buying decisions.

C/PBS includes an optional on-line order-processing facility in addition to more conventional batch processing. It also provides for order allocation and release and back order management to respond to customer needs and their value to the organization.

Order-point analysis and multilevel inventory control are part of the system, as

is purchase order discounting and open purchase order management. Receiving and distribution of incoming items is another feature, the company noted.

C/PBS includes a flexible retrieval and reporting system working against a direct access data base. In addition to all the paperwork needed to support order processing, the system can be used to generate sales budget forecasts and other specific management reports.

Though implemented on 360 or 370 equipment, under either DOS or OS, the system is distributed in source code and could, with some modification, be moved to other CPUs that have an ANS Cobol compiler.

C/PBS requires 94K of memory for the on-line system and at least one disk for the data base. Each module — order processing and inventory management — is available now for \$18,000 from 136 Old Farms Road, 06092.

The men who know their business get their computers from Computer Leasing Company

Bob Goelkel does



Robert A. Goelkel, EDP Manager, Law, New Trust and Savings Bank, Chicago

CLC
Computer Leasing

2001 Jefferson Davis Hwy. Arlington, Va. 22202
(703) 521-2900 • Offices Nationwide

Selling ... leasing ... renting computer equipment to the nation's business and financial communities

We know computers and speak your language at our

CHICAGO OFFICE

Located at
3158 Des Plaines Ave., Suite 31
Des Plaines, Ill. 60018
(312) 298-0888

Call Doug Hebeisel to find out how CLC can help you by buying, selling, leasing or trading computer systems and peripherals.

CLC
Computer Leasing

2001 Jefferson Davis Highway
Arlington, Va. 22202

Offices Nationwide
Member, Computer Lessors Association

TSO Users Gain Most Under VS

(Continued from Page 15)

results. Still, we feel they represent a reasonable summary of the fragments of data available, and are adequate for overall planning purposes.

1.2 Times the Power

Three tests of a 65 compared with a 158 all showed the 158 to have more than 1.2 times the power of the 65. Much more extensive tests comparing a 158 in MVT with a 158 in VS2/R1 showed, approximately, a standoff. However, the detailed analysis of these tests showed that if the CPU utilization is less than 60%, there is a throughput increase of VS2/R1 over MVT.

For VS2/R2, we based our assessment upon preliminary results of certain models made available to us by IBM, which suggested a 20% improvement with VS2/R2 over VS2/R1, and used this as the basis for our estimate that a 158 under VS2/R2 would have approximately 1.5 times the "power" of a 65.

All the benchmark data discussed above was for batch work. For on-line systems, one would expect even more significant factors of improvement, including the ability to achieve a higher degree of multitasking, processing more transactions "simultaneously." We found one set of benchmark data which confirms this.

It appears that the VS operating systems will give improvement in throughput, but not anywhere near the order of magnitude which had been widely anticipated.

However, throughput should not be taken as the sole measure. The VS operating systems provide a number of additional capabilities which can significantly enhance "effective throughput," the net work accomplished and other benefits. These factors cannot be measured as objectively as throughput; still, they may be important in the overall performance of a data processing system.

The additional operating system features are evaluated in Part II.

Romberg is president of ADL Systems, Inc.



**What's a Capex ...
and what will it do for me?**

Well, let's see...

A **capex** is a software company that can save you time and money

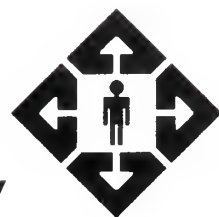
A **capex** is the COBOL OPTIMIZER II. Over 200 satisfied OS 360 370 users know what a **capex** is, and are glad they found out. They're saving core and CPU time in meaningful amounts.

A **capex** is COTUNE, a COBOL program analyzer that helps the programmer in every phase of debugging, and enables him to quickly find where to concentrate his efforts to improve his program.

A **capex** is AUTOTAB 360 370, a financial planning and analysis program that bridges the gap between the end user and the data processing group.

A **capex** is the proprietary software company that is dedicated to greater system and program efficiency, specializing in the OS COBOL area and well known for its thorough and professional marketing and maintenance support of its products.

If you would like to make a serious evaluation of any of our products, please call or write us. We can arrange an installation and trial evaluation at no cost to you.



capex
CORPORATION

THE EFFICIENCY COMPANY

2613 NORTH THIRD STREET PHOENIX, ARIZONA 85004 TELEPHONE (602) 264-7241

PRODUCT AND MARKET
PLANNING

EDP BUSINESS
STRATEGY

AUERBACH
ASSOCIATES, INC.

PHILADELPHIA • NEW YORK
WASHINGTON • LONDON
(215) 491-8200

BEFORE YOU KNOW IT, IT'S BEFORE YOU.

Now's the time to make your plans to attend The Computer Caravan Computer Users' Forum and Exposition when it comes to a city near you.

Don't wait till the last minute. Now's the time to make sure your schedule includes a visit to the computer show that has already benefited more than 40,000 computer users in its first two years. Here are some of the details of our updated '74 program.



THE FORUMS

user-to-user in '74

The Computer Users' Forums give you a unique opportunity to exchange information with other users and independent experts about current practical problems. Forums run from 9:00 A.M. to 2:30 P.M. each day, including an opening report, panel discussions, morning and afternoon workshops and luncheon. If you register in advance for the User-to-User Forums, you'll save \$5 per day from the price at the door. If you attend all three days, you'll save \$15, just for acting early. (Note that no advance registration is required if you attend the Exposition only).

Here are the Forum topics for '74

- First Day** **Source Data Automation Today**
with workshops on
Point-of-sale, Intelligent Terminals,
Optical Scanning and Off-Line Key Entry
- Second Day** **Data Communications Update**
with workshops on
Network Planning, Front-End Processors,
On-Line Systems and Equipment Selection
- Third Day** **Operations Management**
with workshops on
Performance Measurement, Project Control,
Multi-Vendor Installations and Small Centers

Free afternoon sessions

Each day an important, current topic is discussed in an open afternoon session at 2:45 P.M. — free to all Caravan attendees. In 1974 we'll be looking at:

- FIRST DAY — Personnel
SECOND DAY — Data Communications
THIRD DAY — Data Base Design

The Computer Caravan/74 sponsored by  **COMPUTERWORLD**

THE EXPOSITION

a business show, not show business

From 10 A.M. to 6 P.M. each day, you'll have a unique chance to see and compare the latest EDP equipment and services in a pleasant, uncrowded exhibit hall. You'll see everything from complete systems, to independent peripherals, to software to terminals. And you'll be able to talk specifics about your problems and needs with knowledgeable representatives of leading EDP companies. Because The Caravan has a total of 30 show days in ten cities, no one day is too crowded. The whole Exposition is designed to let you get the facts you want from the people you want to see. And the people you want to see will be there. Here's a partial list of the companies that we'll be keeping on our '74 tour.

American Telephone & Telegraph Company • Anderson Jacobson, Inc. • Auerbach • BASF Systems • Beehive Medical Electronics • Boeing Computer Services, Inc. • California Computer Products, Inc. • Centronics Data Computer Corporation • Cincinnati Milacron • Complanco, Inc. • Computer Devices, Inc. • Computer Transceiver Systems, Inc. • Control Data Corporation • Cooke Engineering • Cullinane Corporation • Data General Corporation • Datapoint Corporation • Decision, Inc. • Delta Data Systems Corporation • Digital Equipment Corporation • Electronic Memories & Magnetics Corporation • General Automation • General Computer Systems, Inc. • Gould, Inc., Data Systems Division • Hazeltine Corporation • Hewlett-Packard Company • Incoterm Corporation • Interdata, Inc. • Intertel • International Communications Corporation, a Milgo Company • Lockheed Electronics Company • Modular Computer Systems • MSI Data Corporation • OMNITEC • Pansophic Systems, Inc. • Penril Data Communications, Inc. • Perdec Corporation • Prime Computer, Inc. • Quantor Corporation • Raytheon Data Systems • Scope Data, Inc. • Shugart Associates • Software Sciences • Sperry Univac, Inc. • Stromberg Datagraphix, Inc. • Sycor, Inc. • Texas Instruments, Inc. • Western Union Data Services Company

Act now

If you'd like to attend The Computers Users' Forums, just fill out the registration form and send it in as soon as possible. Remember, advance registration for the Forums saves you \$5 per day. If you wish to attend only the Exposition, no advance registration is required. Just mark your calendar for the city and dates you want to attend and come to the location indicated in the complete schedule



FORUM REGISTRATION USER-TO-USER IN '74

TO: FRANI BLACKLER, THE COMPUTER CARAVAN/'74
797 WASHINGTON STREET, NEWTON, MASS. 02160 (617) 965-5800

Please register me for the forum(s) indicated. I understand that this includes luncheon, workbook and admission to all three days of the Exposition. My check or purchase order is enclosed.
(No advance registration is required for the Exposition only.)

Name _____

Title _____

Company _____

Address _____

City _____

State _____

Zip _____

Please circle one number in each category so that we may better serve you

INDUSTRY

- 01 Mining/Construction/Oil & Refining
02 Manufacturing — Computer or data system hardware/peripherals/other associated mechanical devices
03 Manufacturing (other)

- 04 Utilities/Comm Sys./Transportation
05 Wholesale/Retail
06 Finance/Insurance/Real Estate
07 DP Serv. Bureau/Software/Planning
08 Business Services (except DP)
09 Education/Medical/Legal

- 10 Federal, State and Local Government
12 Communications: Printing/Publishing
13 Other

FUNCTION

- 01 Corporate Officer
02 Data Processing & Operational Management

- 03 Data Processing Professional Staff
04 Consultant
05 Lawyer/Accountant
06 Engineering Management Scientific/R & D
07 Sales/Marketing/Account Executive
08 Librarian/Educator
09 Other

- ☐ First Day — Source Data Automation Today
☐ Second Day — Data Communications Update
☐ Third Day — Operations Management

Check city

- | | | |
|--|---------------|--|
| <input type="checkbox"/> St. Louis | Apr. 3-5 | Chase Park Plaza Hotel |
| <input type="checkbox"/> Chicago | Apr. 9-11 | Hyatt Regency O'Hare |
| <input type="checkbox"/> Boston (Woburn) | Apr. 15-17 | Northeast Trade Center (Rte. 128, Exit 39 or 40) |
| <input type="checkbox"/> Charlotte | Apr. 23-25 | Charlotte Civic Center * |
| <input type="checkbox"/> New York | Apr. 30-May 2 | Americana of New York |

Total number of days registered _____ times \$30=\$ _____

☐ Check enclosed

☐ Purchase Order enclosed

Registration at the door: \$35 per day
Advance registration: \$30 per day

For additional registrations, please copy this form.

*Note: Earlier ads had incorrect location for Charlotte. Correct location for both Forums and Exposition is: Charlotte Civic Center, 101 South College Street

**The cost
of remote data
collection just
became news.**



The Sanders 8100 Remote Batch Terminal System can promote savings from all angles. It has exceptional remote-site data entry capabilities in a cost-effective hardware/software package.

The programmable, clustered 8100 system offers 5-megabyte disk storage, source-document screen formatting, broad error-checking and editing and Sanders-supplied software for complete system integration. It eliminates card-punch operations, reduces CPU line charges. It simplifies, controls, standardizes and improves turnaround time.



The 8100 is still another answer from Sanders technology rooted in unequalled terminal-industry experience. We have the hardware, the software, the maintenance support — and the proven reliability. Sanders Data Systems, Inc., Daniel Webster Highway-South, Nashua, N.H. 03060. Call (603) 885-3727.

Sanders...the intelligent answer

European Sales Offices: Sanders Data Systems, Ltd., 51/53 Brick Street, London W1Y 7DU, England; Sanders Data Systems, GmbH, 6000 Frankfurt/Main, Rennbahnstrasse 72/74, West Germany.

Cobol Chain Files Key to Payables

ANDOVER, Mass. — A new version of the MMS Accounts Payable package from Software International Corp. provides DOS or OS/360-370 users with chain file techniques accessible through Cobol.

The system contains complete vendor financial history, cash commitments by due date in detail and summary form, and a capability of checking for duplicate vendor invoices. Multicompany and multibank options are also included.

The new system uses a Data File which triggers all check writing, and allows the user to vary the payment data, or hold payment on individual vendor invoices or on specific lines on an invoice. By entering dates to be processed, the user can "pull" the chains for those dates without disturbing any others.

If several dates are pulled at one time or if vendors have more than one invoice to be paid in one processing cycle, the system will summarize and generate only one check for each payee.

In addition to analysis for negative or zero balance amounts before check writing, the system creates 14 reports, labels, Rolodex file cards and a vendor master book.

The system is made up of 25 ANS Cobol programs that can run under OS or DOS on a 360 with at least 64K bytes of storage.

The new Accounts Payable package costs \$14,500 (DOS) or \$17,500 (OS).

Software International is at 2 Elm Sq., 01810.

'Quikjob II' Updated

DAYTON, Ohio — Quikjob II, the load-go report writer from System Support Software, now provides both DOS/OS users with TRACE facilities, ACCEPT/DISPLAY verbs for console I/O.

DOS/360 users also gain Isam file creation, standard label support and a multiple input file option with the new Quikjob release. The system is available for \$50/mo from 1132 Donson Drive, 45429.

APL Meeting Planned

ANAHEIM, Calif. — The sixth annual international APL Users Group Conference is scheduled for May 14-17 at the Sheraton Anaheim Hotel here.

Registration (\$40 for regular attendees; \$15 for students) covers all sessions, copies of the proceedings and meals. Requests for information should be addressed to Robert Schaulis, director of the computer center at Coast Community College District, Costa Mesa, Calif. 92626.

The mechanization of the average consumer

A look at automatic consumer systems — in our April 24th Autotransaction Supplement

Those simple little cash registers and friendly neighborhood bank tellers are on their way out, and magic wands, laser optical scanners, on line terminals and computerized banks are coming in. These new machines and systems can read prices and inventory numbers, check credit, issue immediate sales reports, and even transfer checking funds automatically. And they are completely changing the retail business. It's all called AUTOTRANSACTION, and it's the subject of our April 24th Supplement, edited by Ron Frank.

Ron will examine current systems — what they do for the users, and what they mean to consumers. He'll have case studies and interviews with autotransaction users. And he'll take a look at the future of this infant industry.

If you're involved in this field, you should be involved with this special report. For advertisers, the closing date is April 5th. Contact your *Computerworld* representative for all the details. Or call Judy Milford at (617) 965-5800.



COMPUTERWORLD 797 Washington Street
Newton, Mass. 02160

Boston
Bob Ziegel
Mike Burman
(617) 965-5800

New York
Don Fagan
Frank Gallo
(212) 594-5644

San Francisco
Bill Healey
Jerry Thompson
(415) 362-8547

Los Angeles
Bob Byrne
Joseph Ryan
(213) 477-4208

155 or 158?

That's the decision faced by many users of large IBM computers. It's a tough decision, but Cambridge makes it even tougher. Because our 370/STOR 155 add-on memory has features that can make your Model 155 processor perform like a 158 – and then some. Take a look at the checklist – and then make your decision:

MODEL 155 with 370/STOR			MODEL 158 from IBM	
YES	NO		YES	NO
<input checked="" type="checkbox"/>	<input type="checkbox"/>	1. Four megabytes of main storage capacity	<input checked="" type="checkbox"/>	<input type="checkbox"/>
<input checked="" type="checkbox"/>	<input type="checkbox"/>	2. Dynamic address translation features	<input checked="" type="checkbox"/>	<input type="checkbox"/>
<input checked="" type="checkbox"/>	<input type="checkbox"/>	3. Up to 30% more CPU cycles than Model 155	<input checked="" type="checkbox"/>	<input type="checkbox"/>
<input checked="" type="checkbox"/>	<input type="checkbox"/>	4. High-speed addressing of main memory	<input checked="" type="checkbox"/>	<input type="checkbox"/>
<input checked="" type="checkbox"/>	<input type="checkbox"/>	5. Use of either VS1 or VS2 operating system software	<input checked="" type="checkbox"/>	<input type="checkbox"/>
<input checked="" type="checkbox"/>	<input type="checkbox"/>	6. 25% less physical floor space than Model 155 from IBM	<input checked="" type="checkbox"/>	<input type="checkbox"/>
<input checked="" type="checkbox"/>	<input type="checkbox"/>	7. Virtually no conversion or installation costs	<input type="checkbox"/>	<input checked="" type="checkbox"/>
<input checked="" type="checkbox"/>	<input type="checkbox"/>	8. No additional storage adapter required for expansion	<input type="checkbox"/>	<input checked="" type="checkbox"/>
<input checked="" type="checkbox"/>	<input type="checkbox"/>	9. Ability to reconfigure main memory	<input type="checkbox"/>	<input checked="" type="checkbox"/>
<input checked="" type="checkbox"/>	<input type="checkbox"/>	10. 35% less costly than a Model 155 with all IBM hardware	<input type="checkbox"/>	<input checked="" type="checkbox"/>

That's what 370/STOR 155 can do for your installed Model 155 processor. We almost turn it into a 158 – and then some – for about one-third less than it will cost from IBM.

Sure, your decision is tougher now. Or is it?

CAMBRIDGE.

A good place to put your information.

360/CORE

Up to two megabytes of main memory for Models 22, 30, 40, 50, 65 and 67 processors in the System 360 line.

370/STOR

Up to four megabytes of main memory for the Models 145, 155 and 165 in the System 370 computer family

EXPANDACORE-11

Memory expansion systems for all PDP-11 processors, featuring up to 30% speed increases. Two-way data save and interleaving.

EXPANDACORE-620

Up to 65K of main storage for all 6201, L, F-100 and L-100 minis. Self-contained and self-powered 5 1/4" plug-in systems

OTHER MEMORIES

Core, semiconductor and DDT data storage systems for OEM and End-user computer mainframe, controller, peripheral, terminal and auxiliary memory products



CAMBRIDGE MEMORIES, INC., 696 Virginia Road, Concord, Mass. 01742 (617) 259-9880

**"We can't confirm any reservations out here.
"What's the problem?"**



If your data communication network is supposed to tie together 25 cities all over the country, 24 isn't good enough. Because, if the network isn't 100 percent right, all the time, it can lose track of a lot of reservations. (Or mess up somebody's bank account, or lose a big sale.) No matter what the application, Intertel builds data communication systems that guarantee that your network will be there when you need it.

We'll eliminate most network downtime with a backup system for your private phone lines, and on-line spares at critical points in the network, all under your control at the central site. We'll eliminate false service calls and finger-pointing between vendor service organizations, by giving you diagnostics that let you pinpoint problems, from the central site, before you call the service engineers. We'll eliminate the confused

wiring and the stacks of modems you see in most central-site installations by putting all your diagnostic, preventive maintenance, backup, and data transmission functions in one compact, modular Intertel data communication system. For more information, write or call for our brochure (Intertel, 6 Vine Brook Park, Burlington, Mass. 01803 ☐ 617/273-0950), or see us at the Computer Caravan or the ICA Conference.

intertel

Life Insurance for Data Communication Networks.

Savings Seen in Consolidation

RJE Terminals Replace CPUs

By Patrick Ward
Of the CW Staff

NEW YORK — By replacing its divisions' CPUs with RJE equipment which accesses a central computer site, Bristol-Myers Co. expects substantial savings, D.R. Knight, the firm's telecommunications manager, believes.

Company headquarters, and the Clairol and Bristol Labs divisions, are already relying on the consolidated computer center located in Stamford, Conn., or running parallel with it, Knight said.

Bristol-Myers has also set up a temporary Midwest consolidated computer center serving two divisions in Indiana. The Midwest center is slated to cut over to the Stamford one in 1975, Knight added.

The company started its move toward centralization in early 1973 by installing a Data 100 RJE terminal in the New York corporate headquarters to access the Clairol Division's CPU in Stamford. A month-long parallel run followed, and then the 360/40 at corporate headquarters was taken out.

The divisions using RJE are doing all the applications they had done before: "everything from payroll on up to IMS data base applications," the spokesman explained.

Smooth Transition

The RJE approach has worked extremely well with relatively few problems, and the transi-

tions to RJE have been on schedule so far, he added.

This first step demonstrated to all the divisions that the RJE system was feasible and would save money, Knight commented.

In November 1973, the company opened its consolidated computer center at another location in Stamford.

Bristol-Myers did not want to place the consolidated center at one of the divisions, and so create the impression that that division "would get some kind of 'preferred' status," Knight mentioned.

The company took out Clairol's CPU this February, replacing it with another Data 100 RJE unit.

In Evansville, Ind., a 3704 front end was added to the Mead Johnson Division's 370/145. Another division in the same state began running parallel with Mead Johnson's computer in February.

By midyear, three more divisions are scheduled to begin relying on the IM-byte 370/158 with a 3705 front end at the center in Stamford.

Bristol-Myers has standardized the RJE equipment by using either Model 70 or 78 Data 100 terminals with Codex modems.

Batch transmission is at 9,600 bit/sec over 4-wire leased lines in full-duplex mode.

Additionally, GT&E CRTs at Bristol Lab access the consolidated computer center via Codex 4800 modems, and IBM 3270s at the Clairol Division use Codex 7200 bit/sec modems.

In June or July, a New Jersey division will begin transmitting

to the central site at 19.2 Kbit over two lines using Codex Biplexers.

Data 100 terminals were chosen, Knight said, because that was "the most solvent" supplier looked at. The vendor also had a good field support department and a good reputation among the users Bristol-Myers people talked with, he commented.

Bristol-Myers chose Codex modems, he continued, because it felt the company was the leader in built-in diagnostics at the time, and also offered a dual dial backup option.

The modems used with RJE have this option and it has proven very valuable in allowing continued transmission at up to 4,800 bit/sec if the primary line fails, Knight remarked.

Although Knight said his firm rents the RJE terminals on a three-year lease with a one-year termination option, Bristol-Myers bought the modems.

"We came up with a rather compelling fact," he explained. "At the end of two-and-a-half years the cost to us of the modems would be amortized... and we didn't see anything on the horizon that was going to impact the system."

Modem Converts to RF

NORWALK, Conn. — Teleplex has introduced a digital-to-radio frequency (RF) modem for local mode use over coaxial cables at distances up to about 3,000 feet.

The Teleplex modem costs between \$100 and \$250 from the firm at 327 Connecticut Ave., 06854.

Intrastate Price Cuts Asked For N.Y. Data Access Devices

By Ronald A. Frank
Of the CW Staff

ALBANY, N.Y. — A Public Service Commission (PSC) hearing examiner here has recommended that intrastate charges for Data Access Arrangements (DAA) provided by the New York Telephone Co. be reduced. Also recommended was a credit for DAA users who do not utilize a phone.

The recommendation was the outcome of a complaint first filed in 1972 and was the subject of extensive hearings. The examiner said New York Telephone is "currently collecting excessive DAA rates."

The findings cannot take effect until parties in the case have an opportunity to file briefs and reply briefs. After that the PSC will vote whether to accept the recommendations. This could delay the final decision for about three months, according to one expert.

The examiner, John T. Vernieu, said the rates suggested by the PSC staff were justified and DAA rates should be reduced. The CBS unit which now costs \$6/mo should be dropped to \$4.28/mo; the CBT unit is now \$4/mo and should be \$2.91/mo; and the CDT device should be changed from the current \$2.46/mo to \$1.87/mo.

In addition, the examiner said users who install a DAA but have no need for a telephone should be granted a \$1/mo credit for each line. "Equity mandates rate relief

to a DAA customer... who opts not to take a telephone handset," the recommendation stated.

The original complaint was filed by Dr. Robert J. Robinson, director of the computing center at the state University of New York at Albany. The complaint was filed "as a data user who had a feeling that the rates were too high," said Robinson, who was joined by the Independent Data Communications Manufacturers Association (IDCMA) which agreed the rates should be reduced.

In reaching his recommendations, Vernieu said, "The burden of proof is upon New York Telephone... to justify its DAA rate reasonableness." There is "strong doubt" that the rates are reasonable, he said, and the phone company has been overstating DAA installation hours in addition to relying on "inflated annual maintenance costs."

The findings brought out that the rate development supervisor for New York Telephone, who was a witness at the hearings "had himself neither read the Bell System publications describing DAA installations nor had he ever watched an installation," according to the examiner's findings. It was brought out that New York Telephone failed to undertake any specific studies and that it elected to "rely almost exclusively on judgments" of its staff for figures related to setting the DAA rates.

Carterfone TTY For TWX, Phone

DALLAS — Carterfone is offering a Model 33 teletypewriter terminal that can access both the TWX and telephone networks.

Incoming TWX or DDD calls are answered automatically regardless of the last operating mode used, according to the firm.

If one line is in use, calls to the other line receive a busy signal.

The terminal is available with either a rotary dial or Touch-tone pad.

The terminal leases for \$75/mo including service, with delivery in 30 days from the firm at 2639 Walnut Hill Lane, Suite 223, 75229.

Codex Has Three Alterable, Intelligent Multiplexers

NEWTON, Mass. — Codex Corp. has introduced a series of intelligent time-division multiplexers (TDM) that utilize stored-program memory configurations to assign channels.

The 900 Series includes three models differing mainly in the number of channels which can be supported. The 910 handles up to eight channels, two of which can be synchronous; the 920 supports up to 64 channels, four of which can be synchronous; and the 930 handles up to 64 channels and adds autospeed detection, auto CPU channel

contention and selection and multinode operation.

The TDMs support synchronous channels operating from 1,200- to 7,200 bit/sec and asynchronous channels operating at 75- to 1,800 bit/sec. The channel combinations are limited only by the throughput rates of the modem. For each channel, up to four control signals, as well as data and break signaling, can be transmitted in each direction. The asynchronous channel modules support 5- and 8- level communication codes with up to two stop elements.

Channel configurations can be controlled by four types of memory in the TDM "mainframe," depending on the user's needs: a volatile RAM is remotely programmable; a non-volatile factory-programmable ROM; a dual ROM that can be switched between two configurations; and an alterable ROM that is both nonvolatile and field-programmable.

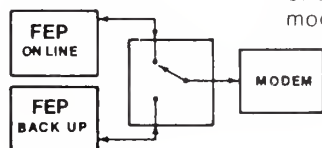
A test panel allows system-level monitoring and reprogramming of all TDMs equipped with alterable memory from a single program panel.

Prices for the 900 Series range from \$2,000 to \$10,000. A typical 32-line system with ROM would cost \$1,800 for the mainframe plus \$150/channel. Lease rates for the same system would be \$90/mo for the mainframe with \$7/mo for each channel.

Also introduced was a compatible version of the Bell 303 data set. The 8300 group band modem can operate only on private transmission networks at speeds from 48- to 64 kbit/sec. The data set costs \$6,500. The firm is at 15 Riverdale Ave., 02195.

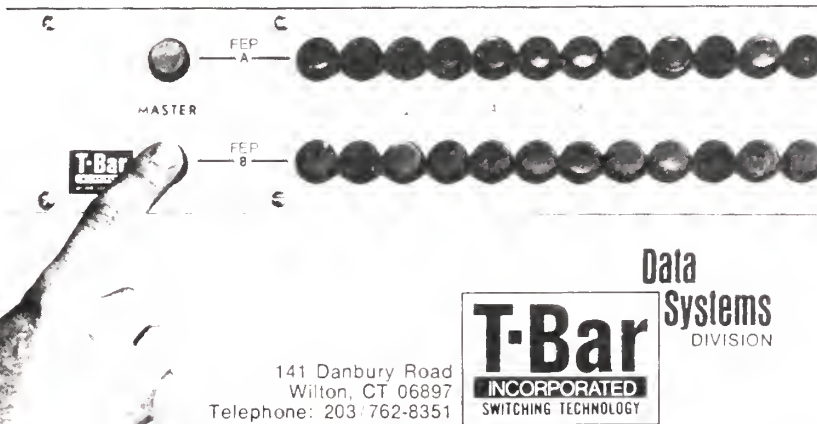
Switch RS232 lines between FEPs instantly...

T-BAR® Series 5100 Remote Control EIA (RS232) FALL BACK SWITCHES are new, fast and reliable, allowing operators to switch modems or terminals singly or simultaneously-in-groups between two or more FEPs... or between computer ports from on-line to stand-by modems... or other terminals.



Available in 8 or 16 channel standard 19" rack units. As low as \$175.00 per channel.

T-Bar Universal Fall Back Switches have been used successfully to switch various Front End Processors, including IBM 3705, IBM 270X, UNIVAC 1108, Burroughs 5000, Memorex 1270, DEC PDP-11, 45.



Data Systems
DIVISION

T-Bar
INCORPORATED
SWITCHING TECHNOLOGY

141 Danbury Road
Wilton, CT 06897
Telephone: 203-762-8351

Introducing the BASF Flexydisk I

Our new Flexydisks have been specially designed and formulated to provide trouble-free performance on 3740 and compatible equipment utilizing flexible disks.

Each Flexydisk 1 has 77 tracks and can store up to 252,928 bytes ... or approximately 3,000 80-column cards. There's no better buy than BASF Flexydisks, and here are some of the reasons why:

Flexydisks are 100% Certified error free... and they're initialized.

Every Flexydisk 1 is 100% certified so you won't have mistakes to cope with. Each disk is also pre-formatted for immediate use. Flexydisks

have a clean, debris-free surface like our computer tape. A special dual-purpose coating gives increased disk and head life. Our tests have shown head wear to be less than 23.5 micro-inches in 92 hours of head loaded operation!

Flexydisks won't leave you short if 3740 equipment is updated, either. We've coated and finished them on *both* sides. Just to be sure.

Flexydisks are Self-Cleaning.

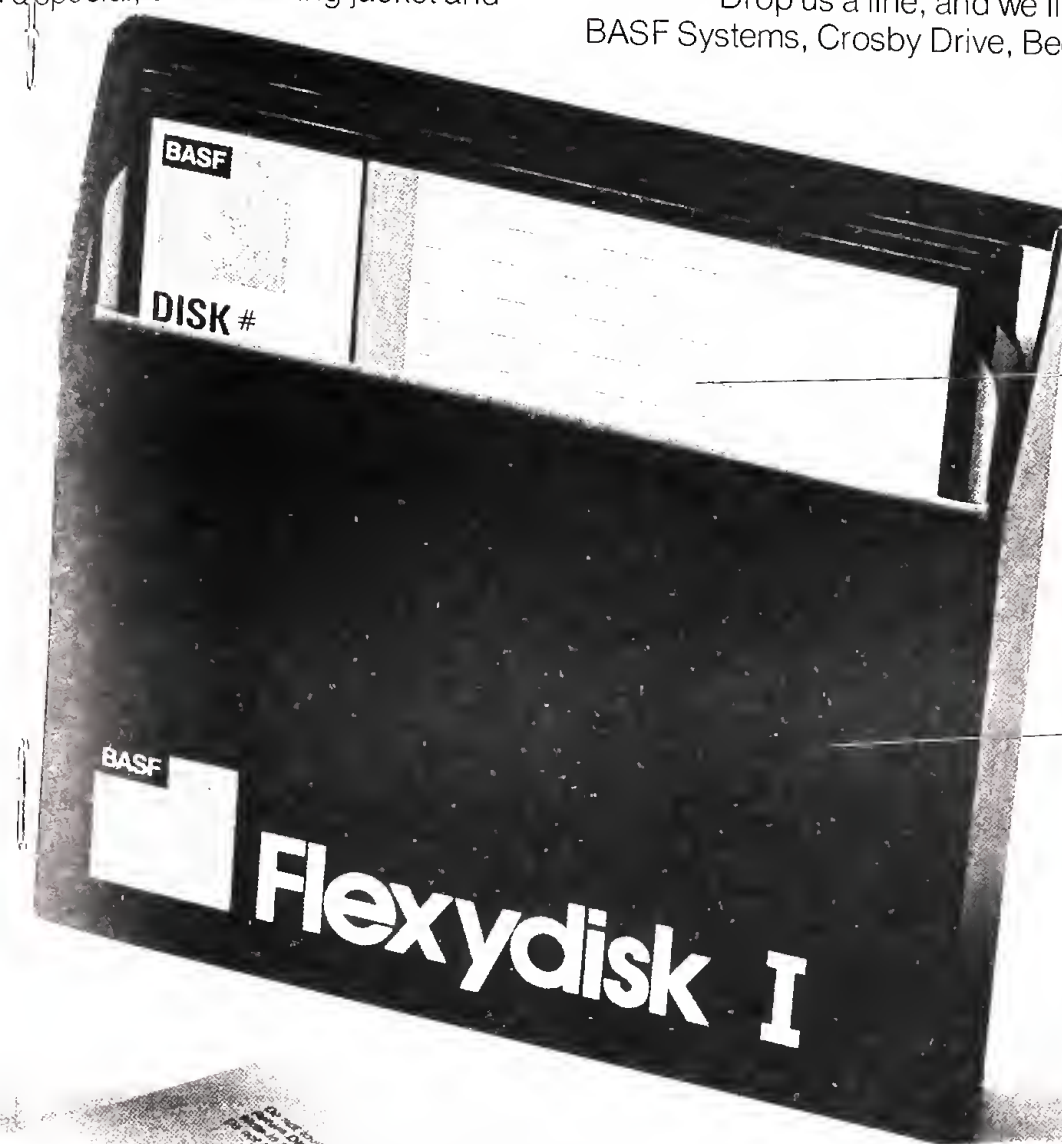
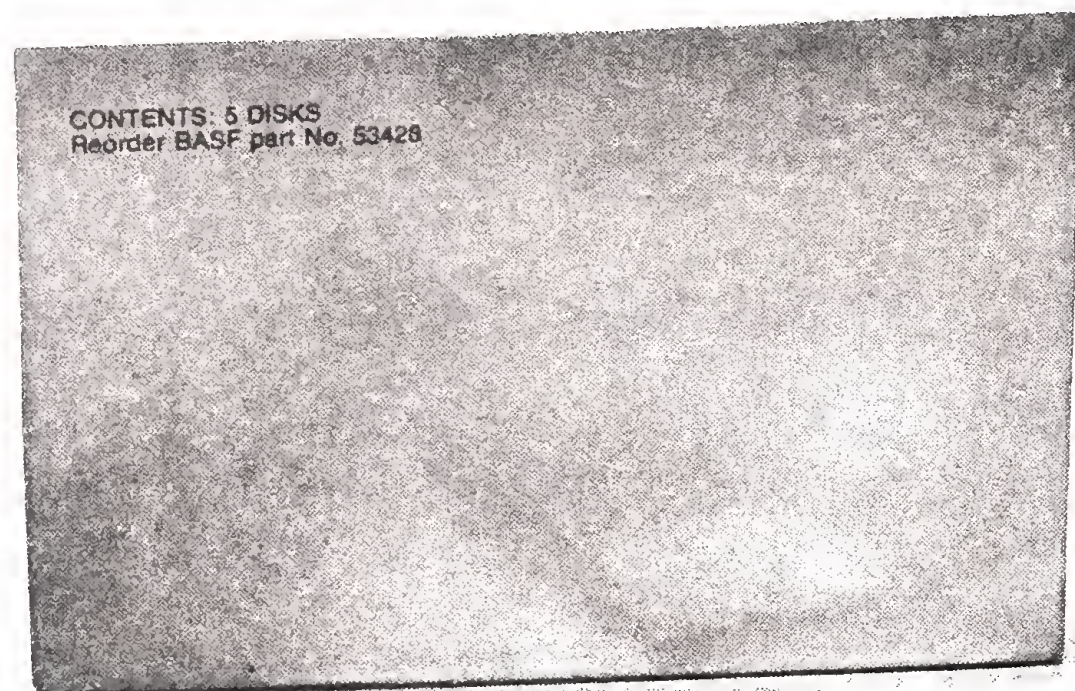
We pack our Flexydisks in a special, self-cleaning jacket and

liner. This unique method of packaging cuts down on friction and the possibility of errors.

Flexydisks are Easily Stored and Mailed.

A good product deserves a good package. Flexydisks come in compact, tabulated library 5-packs. They save on storage and record-keeping, and make neat desk-top files. They're a great time-saver. A supply of color coded labels is also included for easy job identification.

Drop us a line, and we'll send you complete details on Flexydisks. BASF Systems, Crosby Drive, Bedford, MA 01730.



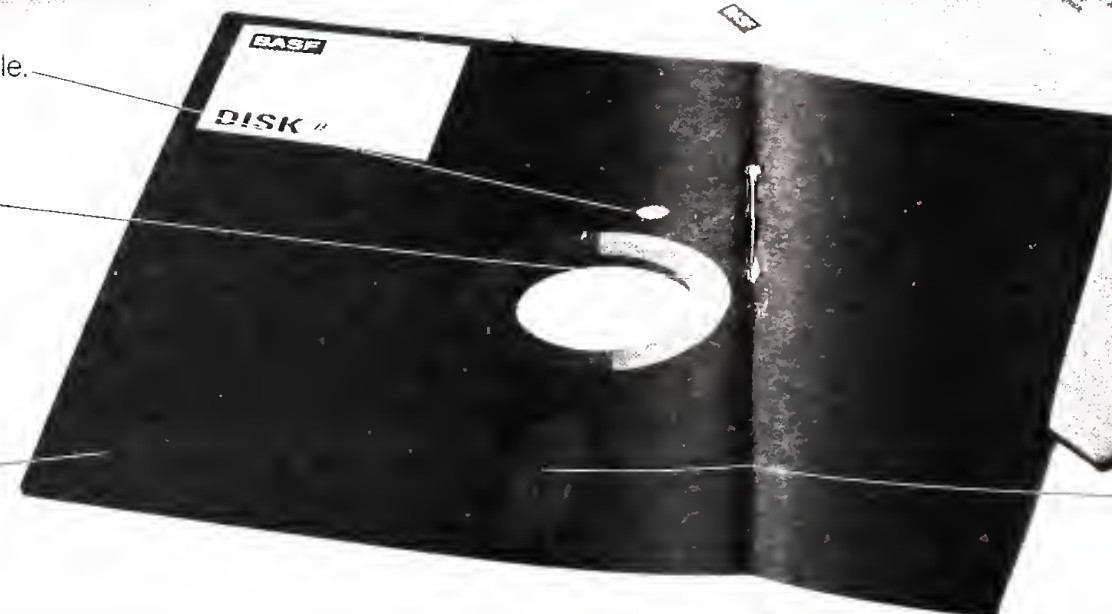
Color-coded I.D. labels are included for easy cataloging of disks.

Self-storing package... the box serves as a convenient, desk-top file.

Index hole.

Ultra-smooth coating... our special formulation plus unique finishing method gives Flexydisks longer life. 100% certified to be error-free.

Jacket and liner... supports and cleans disk surface, cutting down on errors.



Recording area.

Storage sleeve protects against fingerprints, dust, and environmental damage.

You're already paying for BASF quality, you might as well have it.



MEMORY SALE

Short term leases/low prices

Expand your S/360 capacity now

CORE AVAILABLE FOR

Model 30
Model 40
Model 50
Model 65
Model 67

Call Bob Bardagy, (203) 661-4200, at Randolph, the Computer Leasing Company.
537 Steamboat Road
Greenwich, Connecticut 06830



Display Terminal Has 16 Function Keys

ANAHEIM, Calif. — Lear Siegler, Inc. has announced a Data Display Terminal with function and memory capabilities.

The ADM-2 provides the user with flexibility of format, editing, interface and transmission.

The basic keyboard of the terminal is a standard 53-key TTY and, in addition to the 16 function keys, contains a numeric 10-key pad. The CRT utilized in the terminal measures 12 inches diagonally, and can display 960 or 1,920 characters on a 12- or 24-line format. The ADM-2 can display both upper- and lower-case characters.

Features of the terminal in-

clude optional polling, teletype-writer compatibility, and free-form output mode for hard-copy presentation.

When editing, the operator may clear the screen using a destructive cursor for character change, insert and delete characters or insert and delete entire lines. Cursor control also allows

the user to skip, backspace, fore-space, move up, down, return, home and originate a new line. A "field protect" mode is incorporated.

Cost of the ADM-2 is "well under" \$3,000 with deliveries in about three months.

Lear Siegler is at 714 N. Brookhurst St., 92803.

RJE Terminals Have Tutorial CRT

UTICA, N.Y. — A lower-priced remote job entry version of its 2300 family of communications terminals has been added by Mohawk Data Sciences (MDS) Corp.

The 2300 RJE Terminal has a tutorial CRT and a standard typewriter keyboard with key-stroke-controlled setup, both of which are said to help speed the operator through the setup procedure with fewer errors.

A typical 2300 RJE configuration will include a controller with processor and 4K of memory, a 230K-byte fixed-head disk, a standard typewriter-style keyboard, a CRT display, a 300 line/min printer and a 300 card/min reader.

Other printer options include a 30 char./sec printer, a 100 char./sec matrix printer and a 380 line/min chain printer. The system may also be configured to include one or two cartridge tape drives. Software will support IBM 2780 and 3780 communications applications.

Deliveries on the new terminal will begin in August 1974. Typical configurations will rent for from \$595/mo to \$785/mo. The firm's mailing address is Box 362, 13503.

MDS

Mohawk Data Sciences

If you're a small user with a small data center, or a big user with small, satellite data centers, look at our new 4- to 12-keystation System 1200.

It has the muscle to let small operations think big. Data purification and reformatting, plus complete range and error checking. And verification, accumulation and editing. All so you'll send clean and accurate data to your mainframe.

And you get your pick of up to 256 different formats. Even RJE communications, when you want to call home.

It's all wrapped up in a single, economical package. Disk, processor and tape drive are included in the compact control unit.

The keystations are the same ones proven for over two years now in our larger System 2400 key-to-disk.

The 1200 has a lot to offer your small data center. A call to your nearby MDS office, or to our headquarters at (315) 792-2424, will bring you the full story.

Find out for yourself why data-entry products like our Data Recorders, our powerful system 2400's and our new compact System 1200 have made our user list the second largest in the industry. Mohawk Data Sciences Corp., Utica, N.Y. 13503.



**Now Mohawk has
a powerful key-to-disk
everybody can afford.**

DG Minis Offered CRT Display System

SUNNYVALE, Calif. — Data Disc, Inc. has a low-cost, multi-terminal graphic CRT display system, the 6500, for Data General computers. The system is available with as many as 16 independently operating terminals displaying up to 4K characters each.

The 6500 Graphic Display System features a 512 by 512 point matrix which permits alphanumeric or graphic images. The image on each display is stored in a dedicated portion of a centrally located refresh memory, equivalent to 32K bytes of storage per terminal. The clustered terminal system has a built-in 64 character alphanumeric generator and a graphics generator to keep programming to a minimum. Once an image is written into the display, the refresh memory maintains a flicker-free image on the screen, thereby reducing output loading of the Data General processor.

Full Color

Available with full color capability, the 6500 system can plot continuous or discontinuous functions, complex figures, bar graphs, histograms and annotated graphs. Data can be written light on a dark background or dark on a light background with alphanumeric characters or graphic points positioned anywhere on the screen. Characters may be individually added or deleted without disturbing other portions of the display.

Data Disc offers the graphic display system as an off-the-shelf item, and a 16-terminal system with keyboards, CRTs and a complete computer interface can be purchased for approximately \$4,700 per terminal. The firm is at 686 W. Maude Ave., 94086.



GTE IS/1511-B Key-to-Disk System

GTE Expands Key-to-Disk Unit

By a CW Staff Writer

STAMFORD, Conn. — GTE Information Systems has split its IS/1511 and 1514 key-to-disk systems into four models — a lower-cost up-to-four-station "A" series, and a more powerful up-to-32-station "B" series.

Pricewise the IS/1511-A in its maximum four-station configuration would cost \$650/mo and a four-station IS/1511-B would cost \$880/mo with additional stations at \$70/mo including maintenance. New features in the B series are primarily in the system software and include increased record size up to 240 characters, a 480-character display, up to 500 stored formats with up to eight format levels, automatic linking of format levels and automatic generation of tape labels and operator statistics to magnetic tape.

The 1511-B is priced at \$30,350 and each keystation costs \$360.

The "A" series has the same basic features as the earlier 1511 including record size up to 120 characters, 240-character display, up to 240 stored formats and up to eight format levels. The 1511-A costs \$30,350 with four keystations.

The basic hardware for both series includes a 750-nsec memory cycle CPU, 7- or 9-track mag tape (556 or 800 bit/in.) and 24M-bit disk.

The IS/1514-A and -B models are equipped with communications capability and are priced at \$50/mo additionally for the 1514-A and \$100/mo additionally for the 1514-B.

Optional peripheral equipment includes character and line printers at 165 char./sec and 600 line/min, a 300 card/min reader, different tape drives and disk drives.

The communications adapters allow the systems to become remote batch processors that will emulate the communications of IBM 2780 or 3780 remote terminals transmitting data at line speeds up to 9,600 bit/sec, according to the firm.

GTE Information Systems is at One Stamford Forum, 06904.

Systems Houses Utilize Datapoint 2200

By Vic Farmer
Of the CW Staff

The Datapoint 2200 intelligent terminal with its self-contained minicomputer is quickly becoming a center of attention for systems and turnkey houses looking for a minicomputer to attach small business-oriented applications.

But, more importantly, two systems houses have packaged their equipment and related software into bundles that will help users set up their own applications.

One of the more advanced of the systems companies is Omniware Systems, Inc. which was recently launched by Encompass Systems, Inc. of Bethesda, Md., and Control Systems Research, Inc. of Arlington, Va.

The latter two companies have pooled the software resources of the first with the hardware engineering of the second to come up with a small turnkey system with considerable software support. The Datapoint 2200 with 5M bytes of cartridge disk, synchronous communications adapter, card reader, line printer and multiplexer for CRT terminals is priced at \$80,000, and two- and three-year full payout leases are available as well as other hardware options.

But the key to this small system is the software Omniware packs with the system for off-line applications.

Up to eight remote (hardwired or dial-up) CRT terminals may concurrently access the system for:

- Key-to-disk data entry.

- Text processing.
- Letter writing.
- Data file maintenance.
- On-line interactive Cobol source generation.
- Cobol and Fortran documentation systems (including flowcharting).
- Source program maintenance system.
- Tape library system.

With a single user, RPG II and time-sharing Basic are said to be also available. All software is bundled and the firm does not yet offer the software separately.

In addition, the remote job entry systems available include emulators of IBM 2780, 360/20 (Hasp), CDC User 200, Univac DCT-2000 and Univac 1004 terminals, as well as off-line utility routines such as copy and sort/merge.

If the Omniware package is too extensive, the present Datapoint 2200 user can get peripherals that fill gaps in the Datapoint line separately from RDA, Inc., which over the last several weeks packaged, for the end user, peripherals, interfaces and related software it has been using in some of its turnkey systems.

This equipment list includes: three printers, card readers and punches, OCR reader and key-to-tape application and four remote CRT display options.

The RDA 2020 is an Odec Computer Systems printer with a 64- or 96-character set that prints up to 220 line/min and is priced at \$7,500 or \$225/mo on a three-year lease.

The RDA 2030 is a Diablo Hytype printer, upper and lower case, that prints

at 30 char./sec and is priced at \$5,500 or \$190/mo on a three-year lease.

The RDA 2010 is an IBM Selectric printer priced at \$3,380, with the interface alone at \$990.

Two photoelectric punched tape readers, the RDA 4010 and 4025, give read speeds of 150 char./sec for \$2,030 and 300 char./sec for \$2,130. A 75 char./sec punch costs \$2,940, and a combined 75 char./sec punch and 300 char./sec reader is priced at \$3,840.

The four remote CRT displays all provide 24 lines of 80 upper-case characters on 9-inch to 23-inch screens that range in price from \$2,100 to \$2,500.

Probably the most interesting package from RDA is a 6050 turnkey system that includes a Computer Entry Systems OCR document reader, a Datapoint 2200 with 8K memory, and a Wangco 9-track 800 bit/in. tape drive and is priced at \$29,400 or \$680/mo on a five-year lease.

This turnkey system reads OCR-A font on 2-inch by 3-inch to 6-inch by 9-inch documents; corrections are possible with the 2200 keyboard.

In a separate mode, source data may be entered through the 2200 keyboard utilizing the 2200 mini for format prompting and data verification.

The OCR reader and 2200 interface are available separately for \$10,900 or \$250/mo on a five-year lease.

Omniware Systems, Inc. is at 1515 Wilson Blvd., Rosslyn, Va. 22209; RDA, Inc. is at 5012 Herzel Place, Beltsville, Md. 20705.

HP Aims Dedicated Mini Systems at Business Use

CUPERTINO, Calif. — By making some changes in the HP 2100S operating system and designing specific business-oriented applications software, Hewlett-Packard has come up with two dedicated business-oriented data processing systems.

This Management Series of turnkey systems is not designed for the small user, but instead is aimed at the larger user seeking to either delay his mainframe upgrade or postpone it indefinitely by adding a separate data system.

Dedicated to transaction processing, the M230 system will handle typical applications like order entry processing, in which a minicomputer would control up to 32 terminals. In addition to data entry and editing, the M230 will be capable of additional local processing, according to HP.

The M260 system is dedicated to data base management (DBM) with all the linking of files that most DBM systems have on larger CPUs. Some of the typical applications here are inventory control, personnel files and credit verification.

Key system capabilities of the M260 are multiple terminals, intercommunication of data, I/O processing and high transaction throughput. The M230 uses a 16K 16-bit word HP 2100S minicomputer, upgradeable to 32K words. The systems and

operating control software requires 11K words of memory. Transactions can be recorded either on disk or tape. Disk Storage capacities range from 4.8M bytes to 94M bytes and up to four tape units are attachable with either 800 or 1,600 bit/in. densities.

Programming software includes HP Fortran, HP Fortran IV and Extended Assembler. Utility software includes debugging routines, log editor and a library of commonly used procedures such as decimal arithmetic.

Disk file management through the system console permits adding, changing or deleting disk files. Physical file location is managed automatically, and the disk is repacked to eliminate wasted space.

The basic M230 includes a 16K HP 2100S, 5M byte cartridge disk, 1,600 bit/in. mag tape, paper tape reader, 16 channel multiplexer and console CRT terminal. It is priced at \$48,950 or \$2,600/mo including maintenance on a two-year lease. Terminals offered by HP are the character mode HP2615 and the page mode HP2616.

Data Base System

The M260 priced at \$53,950, or \$2,835/mo (two-year lease), uses the same configuration with 24K of memory

and a 30 char./sec printer instead of the CRT console. Data in the M260 system is maintained and manipulated in the HP Image 2000 data base management system software. Up to 32 terminal users can have simultaneous access to a common data base through a teleprocessing option. The data base can be restructured and expanded without altering related applications programs, according to HP. The system reduces data entry and storage costs by reducing data redundancy through network data structures of automatically linked files and records. The system allows data structures to be independent of physical storage devices and programming languages. It also prevents destruction of data or unauthorized person use, HP said.

In creating the data base the user writes down the relationships among the items in his data base in free format language to establish a schema for the data base. The schema is processed and placed on the disk in a route or dictionary file. Batch data is entered in forms ranging from pencil-marked cards to magnetic tape, and reports are produced on the terminal or optional line printer.

The Image 2000 software previously available can be purchased for \$4,000 separately.

**IF YOU OWN A PDP-8, PDP-11, OR NOVA COMPUTER,
THEN YOU SHOULD KNOW ABOUT THE PRINTEC-100.**

**FOR \$3,850, YOU GET A 55 LPM PRINTER, CONTROLLER CARD, A 15 FOOT
CABLE - AND FULL SOFTWARE COMPATIBILITY.**

PRINTEC-100

- 100 CPS
- Full Character
- Optional Upper/Lower Case Character Set
- Disposable Ink Cartridge
- Adjustable Tractor

PRINTER TECHNOLOGY, INC.

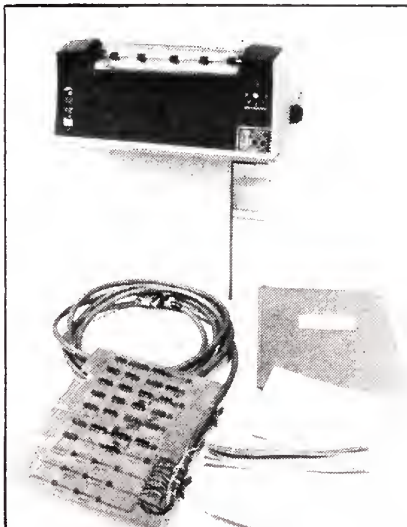
- Over 2,000 Printers Installed
- Nationwide Service, over 40 locations

If you want to do your own interfacing, we will sell you a printer for \$2,650

For additional details:

PRINTER TECHNOLOGY, INC.

Sixth Road
Woburn, Mass. 01801
Telephone: (617) 935-4246
Western Region: (714) 997-0761



360-30s store more with SMART™ core

Up to 512 kbytes for your 360 Model 30

Standard Memories has it! If your machine is a 360 30, Standard can enhance its core storage capacity from the manufacturer's "maximum" of 64 kbytes to 128, 192, 256, 384 or 512 kbytes! 256 kbytes of SMART core will cost you less than the original price of 32 kbytes

On 360 44s, we can move you all the way to a megabyte. The cost: less than the original 192 kbyte expansion and substantially less than any other independent

Standard has enhancement capabilities for almost all the 360 systems, all at tremendous savings! Write today for technical details.

STANDARD MEMORIES
INCORPORATED
AN APPLIED MAGNETICS COMPANY
2801 E. Oakland Park Blvd. Ft. Lauderdale, Florida 33306
TWX 510-955-9828 Telephone (305) 566-7611



3 Print at 1,000 Line/Min

Versatec Announces Matrix Line

CUPERTINO, Calif. — Three of Versatec's five electrostatic printers, plotters and printer/plotters print at 1,000 line/min and plot at 2.4 in./sec on 11-inch-wide paper. The other two units run at 3 in./sec on 20-inch-wide paper.

The Matrix LP-1175 printer prints 132, 7 by 9 dot matrix characters per line. A character generator produces a standard 64- or optional 96- (upper- and lower-case letters) character set. The unit has both parallel voltage level and serial RS232 standard input connectors for accepting Ascii input data, and is priced at \$5,600.

The Matrix 1110 is a raster scan plotter which operates at 2.4 in./sec paper speed in asynchronous mode. Plotting may be done in an area 10.2 inches wide by any length up to 500 feet. The plotter has a total of 1,024 writing nibs in the stationary writing head (100 nib/in.); 128, 8-bit bytes comprise one scan of plotting data and each data bit relates to one nib in the writing head.

The Matrix 1110 plotter is provided with a one-line buffer and is priced at \$6,400.

Three Modes

The Matrix 1110A printer/plotter operates in three separate modes: printing, plotting and optional Simultaneous Print/Plot (SPP). It eliminates the need for using separate printers and plotters, since both functions are performed by the same unit. The printer/plotter has the same plotting characteristics as the Matrix 1110 plotter, plus the printing characteristics of the Matrix LP-1175, and is priced at \$7,200.

The Model 2030 plotter has 100 nib/in. resolution and a total of 1,856 nibs for plotting across 18.5 inches of 20-inch paper; 232, 8-bit bytes comprise one scan of plotting data. Each data bit relates to one nib in the writing head.

Asynchronous speeds up to 3 in./sec in one direction only at the same dot spacing along the direction of paper travel permit square aspect ratio plotting with exceptional accuracy, according to the firm. The 2030 is priced at \$12,300.

2030A Printer Plotter

The Model 2030A printer/plotter eliminates the necessity for using separate printers and plotters since both functions are performed by the same unit. The printer/plotter has the same plotting characteristics as the Model 2030 Plotter and, in addition, can print 232, 7 by 9 dot matrix characters across the page from Ascii input data. The standard configuration includes full 96 Ascii character set permitting upper- and lower-case printing.

Controllers for 29 computer systems are also available from Versatec, including computers manufactured by Data General, DEC, Hewlett-Packard, Honeywell, Varian, XDS, Interdata, IBM, Teradyne and Raytheon. A Fortran software-plotting package, which has been specifically designed for the raster scan plotting technique employed in Matrix plotters, is also available. Versatec, Inc. is at 10100 Bubb Road, 95014.

FFT Unit Plugs Into Novas

SYOSSET, N.Y. — Elsytec, Inc.'s Fast Fourier Transform Unit, the 306/MFFT, consists of one card, which plugs directly into any Data General Nova mini-computer.

The 306/MFFT also can perform hardware single-precision and some double-precision arithmetic operations.

The price is \$6,000 and interfaces for computers other than the Nova are available and will be quoted on request.

Elsytec is at 212 Michael Drive, 11791.

19

OF AMERICA'S TOP 100 BANKING INSTITUTIONS AS WELL AS MANY OF THE NATION'S TOP CORPORATIONS HAVE CHOSEN ALCON DATA'S **CLEAN FILE**

To Merge Undisciplined Customer Records
To Consolidate Account Information
To Eliminate Duplicate Names for Mailing Lists
To Standardize Record Format

CONSIDER THE MANY BENEFITS OF CLEAN FILE TO YOUR ORGANIZATION

No more duplicate mailings to the same customer.
Reduced postage costs in promotional mailings.
No more confusion over names, addresses and family affiliations . . . Standardize freeform records into fixed fields.

ALCON DATA has processed more than 30 million name and address records for major banks and industries from coast to coast.

ALCON DATA is America's leading editor of name and address records. Let Alcon Data explain what it can do for you . . . Customer list available on request.



(203) 384-1361

ALCON DATA CORPORATION
2926 Fairfield Avenue
Bridgeport, Connecticut 06605
ATTN: Mr. Frank Showah, President



Name.....
Title.....
Company.....
Address.....
City..... State..... Zip.....
Phone.....

Get To Know

ADAPSO*

1. Meet Us At Ceasars Palace

Las Vegas, Nevada, May 1-3, 1974 during ADAPSO's 40th Management Conference "The Computer Services Industry in Focus".

OR

2. Send This Coupon Today

and learn about the *Association of Data Processing Service Organizations representing Data Processing Companies throughout the United States. For Industry Protection . . . Standards . . . Education . . . Tools for company development.

Jerry Dreyer, Executive Vice President
ADAPSO
551 Fifth Avenue
New York, New York 10017
Tel: (212) 661-0222

☐ I'm interested in attending ADAPSO's 40th Management Conference in Las Vegas . . . send me detailed information.
☐ Please send to me your brochure describing ADAPSO activities.
No Obligation Of Course!

NAME..... TITLE.....
COMPANY..... TYPE OF BUSINESS.....
ADDRESS.....
CITY..... STATE..... ZIP CODE.....
TELEPHONE NUMBER.....
area code

Disks, Transports Added by Microdata

IRVINE, Calif. — Microdata Corp. has added a series of cartridge disk drives and tape transports to its mini systems. The Series 9000 disk drives provide up to 10M bytes and use 100- and 200 track/in. recording densities in single- and dual-disk configurations. The single-disk version uses a removable IBM 5440-type cartridge and the dual-disk drive adds a permanent rotating disk. Voice coil positioning with an optical position scale and velocity transducer are used and the disks run at 1,500 or 2,400 rpm.

The 5M-byte drive is priced at \$3,900 and the 10M-byte drive is priced at \$4,500.

The 6800 tape transports use 8.5-inch reels, 7- or 9-track, standard densities, in both NRZI and phase-encoded recording formats.

Four drives can be daisy-chained to one formatter. The drives are priced at \$4,000 with NRZI or PE formatter included.

Microdata is at 17481 Red Hill Ave. 92705.

Timer Programmable

SAN LEANDRO, Calif. — A programmable timer board, compatible with DEC 8/e computers, is now available from Douglas Electronics, Inc.

The time base is derived either from a 4 MHz crystal or the 60 Hz line and will produce program controlled time intervals. Time interval counts and counting rates are initiated by IOTs.

The 102-DE-8 is priced at \$350 from the company at 718 Marina Blvd., 94577.

Read-Write Cassettes Ready

NEWTON UPPER FALLS, Mass. — A series of read, write and read-write tape cassette systems is available from Memodyne Corp.

Designated the 100 Series, uses an incremental digital Phillips Cassette-type tape transport. The transport features true "bit-by-bit" acquisition of digital data at incremental steps from 0 to 330 step/sec. Since the tape only advances when data is recorded, substantial tape savings over continuous drives result, in addition to the downtime saved by not having to replace cassettes so often, according to the firm.

Prices vary from \$300 up to \$750 for a complete read-write, TTY/RS232C interfaced system.

Memodyne is at 369 Elliot St., 02164.

\$800 Floppy Controller Interfaces LSI Mini

MOUNTAIN VIEW, Calif. — The Model FDC 101 floppy disk controller, from Minicomputer Technology, interfaces a Shugart Associates SA901 or Century Data Model 140 floppy disk drive to a Computer Automation LSI minicomputer. The controller requires a 1/2 slot in the CPU chassis and controls one or two drives. The format allows over 342K bytes of usable data per drive. CAI-compatible software is included. Prices start at \$800 from the firm at 1901 Old Middlefield Way, 94043.

OEM Products

(White equipment in this column is primarily for Original Equipment Manufacturers (OEMs), in most cases it is also available in single units to interested users. Further, while much of this equipment is not presently available as such to the end user, it does give some indication of techniques and products that may be incorporated into end-user equipment.)

45 Char./Sec Printer Out

HAYWARD, Calif. — Qume Q30 and Q45 printers can print up to 12 copies at 30- and 45 char./sec respectively, and the Q45 can accept unbuffered input from 300 bit/sec data transmission.

Servo-controlled carriage and character-wheel positioning, with ribbon and paper-stepping motors, enable quad-directional moves that increase throughput beyond that of many matrix-type printers, according to the firm.

In quantities of 100, the Q30 is priced at \$1,425; the Q45 at \$1,600 from the firm at 26203 Production Ave. 94545.

The Computer Caravan welcomes:

International Communications Corporation

ICC

as an exhibitor in The Spring 1974 Caravan.

ICC/MILGO will feature high-speed modems for data transmission over dial-up phone lines or leased data lines. Modems from ICC operate at data rates from 2400 bits-per-second to 9600 bits-per-second. The ICC display will include data communication test equipment and accessories. Experienced personnel will be in attendance for consultation.

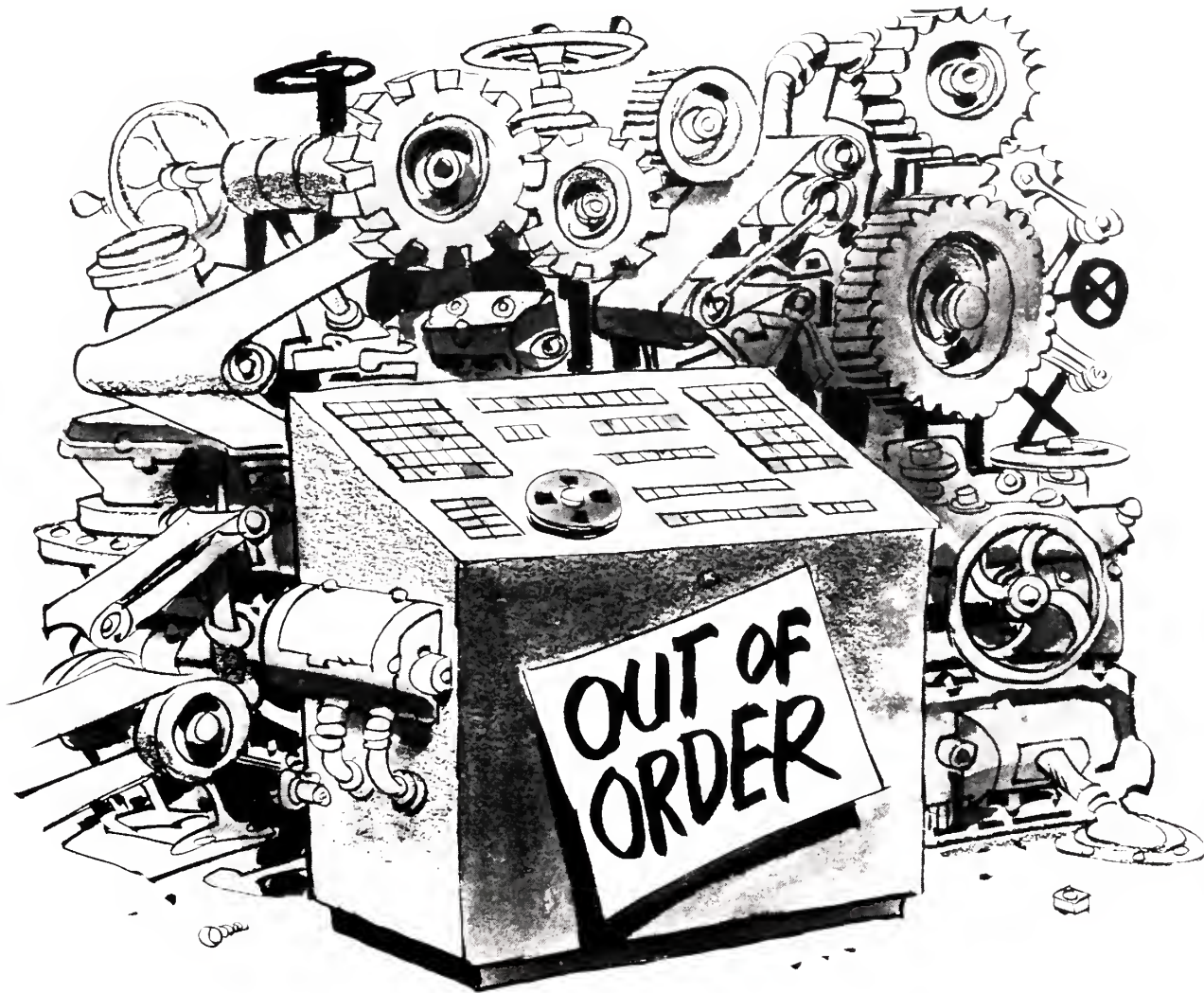
The Computer Caravan/74

sponsored by

COMPUTERWORLD

Washington • Cincinnati • Houston • Anaheim
San Francisco • St. Louis • Chicago • Boston
Charlotte • New York

797 Washington St., Newton, Mass. (617) 965-5800



Would the wheels stop if your parcel didn't get to Boston by 4 p.m. today?

Don't give up. Just get your parcel to the nearest American airport passenger ticket counter 30 minutes before departure time and it will be on its way, on the flight you specify. Then call your receiver and give him the flight and ticket number. He can pick up the parcel minutes after arrival at the baggage service office.

The fastest way to send 50 pounds or less. This like-you-took-it-yourself service applies to any parcel* weighing up to 50 pounds and measuring no more than 90 inches in combination of length, height, and width.

Goes wherever American flies. Priority Parcel Service is available on all daily jet flights — to every domestic city American flies — which covers 82% of American industry.

Charge the charges. American's charges

are based on airport to airport service. You pay as you would for your airline ticket. Cash, check, any acceptable credit card — or we'll bill you later. If you need pick-up and delivery, we can arrange it. For more information call American in the Yellow Pages.

American Airlines Freight System

633 Third Avenue, New York, N.Y. 10017, U.S.A.



American's Priority Parcel Service to the rescue!

*Carriage of letters subject to Private Express Statutes and applicable tariffs

AKP VOLUME KEY PUNCHING
(402) 346-0330



"JUST MINUTES AWAY"

Omaha and Ft. Worth, Texas. Fast dependable service at low cost.

AMERICAN KEY PUNCH

General Offices
Redick Tower
Omaha, Nebraska 68102
and
1121 East Loop 820 S.
Suite 401
Ft. Worth, Texas
(817) 457-1680



MSA SALUTES HENRY AARON



MSA MOVES CLOSER TO HANK WITH 14 SALES OF THE PAYROLL/ PERSONNEL SYSTEM



- 100 DEDUCTIONS
- 6 LEVELS OF CONTROL
- SALARIED AND HOURLY PAY
- COMMISSIONS AND SPECIAL PAY
- SPECIAL REPORT GENERATOR
- BANK SERVICES FEATURES
- LABOR DISTRIBUTION
- COMPLETE TAX REPORTING
- SALARY HISTORY
- SKILLS INVENTORY
- PERFORMANCE RATING
- IBM 360/370; BURROUGHS, RCA
- ANS COBOL; OS, DOS

MSA

Almost 715 computer users have bought one or more of the MSA packages below.

CHECK AND FIND OUT WHY!

- MSA Payroll/Personnel
- MSA General Ledger
- MSA Fixed Asset Accounting
- MSA Inventory Control
- MSA Accounts Payable
- MSA Financial Information and Control System for Banks
- MSA Time Deposits
- MSA Installment Loan
- MSA Financial Reporting for Insurance Companies

Name _____

Company Name _____

Address _____

City/State _____ Zip _____

Send To: William M. Graves,
Executive Vice President

Management Science America, Inc.
3445 Peachtree Road, N.E., Suite 1300
Atlanta, Georgia 30326

Performance Evaluation Avoids Adding Third 370

By Patrick Ward
Of the CW Staff

COLUMBUS, Ohio - A performance improvement team, operator incentives and a hardware monitor helped Nationwide Insurance Co. avoid adding a third 370/155 and peripherals, according to Chuck Nelson, director of computer operations for the firm.

In mid-1972, Nationwide had two 370/155s and had ordered a third 155 to replace a 360/50.

The firm was reluctant to acquire another 155 at the time, "but we weren't sure we could do without it," Nelson said.

The firm decided to take a four- to six-month period to see what could be done, and appointed a performance evaluation team.

This group included a staffer from the technical studies division, a systems programmer, an applications programmer from each of the major applications areas and an operations representative.

All were freed from their regular work to concentrate on the task.

The team decided to try loading up one computer system as much as possible, letting the other one ride, according to Bob Phillips, manager of technical studies.

Paul Cherry, then computer operations director and now director of planning,

used a Compress Dataprobe monitor to produce histograms on CPU activity by the end of each shift.

This meant operators "could see the results of how they had loaded the system, and that just created an incentive to load it even more," said Phillips.

If the operators managed to load the system so the monitor showed the CPU 100% active for 120 straight minutes, the computer operations manager promised to buy pizza for the whole shift. And he has.

Nationwide's installation handles 65 on-line CRTs doing inquiry and a slight amount of data entry. These access a 12-spindle disk data base.

Most of the workload, however, is tape sequential batch processing.

The shop has 35 STC 3470 tape drives, mounts 3,600 rolls of tape over a 24-hour day and runs 100,000 job steps a month.

The 2,400-foot, 1,600 bit/in. tapes contain a complete master file of five million auto and fire insurance records and 600,000 life insurance records.

Common Sense Helps

Although the monitor was useful in showing the gains from different changes, Nelson said that "common sense observation" was equally important in spotting bottlenecks.

Both the monitor and personal observa-

tion showed that programs were extensively overlaying, causing wait time for disks. The systems programmer changed the DOS emulator in the OS system to allow programs that were running under the emulator to dynamically overlay.

This change increased the ratio of CPU time to elapsed time, and, along with operator incentive, was one of the major factors in better CPU utilization, Phillips said.

By February 1973, utilization rates had gone from about 30% to 40% to 70% over a six-day week.

To reach these figures, "We have to be above 90% most of the time," Nelson remarked.

The utilization record stands at 98.2% over a 12-hour period, he added.

Nationwide released the 360/50 and cancelled its order for the third 370/155. It finally upgraded in early 1974 by replacing one of the 155s with a 158.

Nationwide will eventually add a third CPU, but the utilization gain has held off the need for it so far, Phillips said.

The performance improvement team is still active, with its leadership rotated, to prevent fallbacks to lower utilization levels.

Keeping these rates high is "really a never-ending process," Nelson stated.

If you'd like to know more about Audit, Privacy and Security in Data Processing Systems, vote 'yes' below.

Auditing, privacy and security are important problems for most EDP installations today. And this proposed new seminar will cover all three—in a concentrated 2½-day session. If response is sufficient, we'll be conducting the seminar in one or more cities in June, 1974.

The course will cover several key areas

Topics to be covered in this comprehensive seminar include the following:

- Who is responsible for computer room security?
- Who is responsible for data security?
- How to protect data from unauthorized acquisition, modification and destruction.
- How to preclude unauthorized users.
- Types of identification methods for terminals and users.
- Authorization methods for

programs and data—including software controls and lockout features.

- Real-time surveillance to detect violations.
- Cryptography.
- Recovery techniques for real-time systems.
- Controlling data transmission.
- The changing role of the auditor.

Joe Wasserman
will be the seminar leader

Mr. Wasserman is president of Computer Audit Systems, Inc., and a recognized leader in this field. He is one of the first people to specialize in this area, having started over 15 years ago with the Bell System. He has been widely quoted by leading newspapers, including The Wall Street Journal and New York Times, and has written several articles in the security field. He is a Certified Internal Auditor.

Mr. Wasserman will lead the seminar and coordinate presentations of several other experts in various aspects of the security field.

Free Resource Notebook
for all participants

A complete Resource Notebook will be used throughout the seminar and will become a valuable continuing reference work for all participants.

Who Should Attend?

If you have anything to do with the security, privacy or auditing of a data processing installation, this seminar can be of great value in your work in this complex, but increasingly important area. It will help your installation, your company and your own performance.

Vote now, enroll later

Your vote on the coupon below will give us an indication of the demand for this seminar in several cities. Your vote does not obligate you in any way, but it will put your name on our mailing list. When plans are completed, you will receive a complete brochure and seminar registration form. If you're interested, don't delay. The seminar offering depends on your response today. We anticipate that the total fee for the seminar will be \$325, including the resource notebook.



SPONSORED BY
COMPUTERWORLD

To: Walter Boyd, Computerworld, 797 Washington Street, Newton, Mass. 02160

☐ Yes. I'm interested in your proposed seminar on Audit, Privacy and Security in Data Processing Systems. Please send me complete details when plans have been completed.

If the seminars are held in June, I believe I would attend in the following city:

☐ New York ☐ Chicago ☐ Los Angeles

Name _____ Title _____

Company _____

Address _____

City _____ State _____ Zip _____



Photographed on location at the Scotch Whisky Distillery in Scotland.

“Black Watch” waits for the challenge to guard.

“Black Watch” tape has a special-textured back side which guards against cinching, shifting and scratching. You get this “Scotch” 700 tape from the people who developed the first computer tape in 1953. People who will go to any length to solve a customer’s problem. People who thrive on assisting. The Data Recording Products Division of 3M. A proud clan.



Call out the clan.

“Scotch” and “Black Watch” are registered trademarks of 3M Co.

3M
COMPANY

Data Bank Aids Zoning Probe

NASHVILLE, Tenn. — A centralized data bank is providing answers to all but the whys of zoning irregularities for the district attorney and members of the Metro Council Ethics Committee here.

Programmed to provide detailed information on every zoning ordinance since 1971, the computer contains data that is difficult to put together manually, even though it is part of the public record, officials said.

Drawn from such sources as real property tax files and deed books, the data bank aids the ethics committee's investigation of irregularities in zoning rules and the district attorney's preparation of court suits against zoning violators, according to officials.

The IBM 370/145 maintains lists cross-referencing information on the type of ordinance passed to the councilman responsible for introducing the zoning bill. Answers become readily available to such questions as:

- What zoning has occurred on a

specific street in the last three years?

- Who owns the property affected by the zone change?
- Who owns the property on either side of it?
- When was the property sold and who bought it?
- Which bills have been passed over the mayor's veto?
- Which zone changes have been sponsored by a particular council member?
- Where have most zone changes occurred?

The ethics committee requested that the city's main computer be programmed to answer zoning bill questions on a Thursday. By the following Monday, Nashville's DP and computer services department had the program operating.

"There are just too many bills to wade through," a spokesman for the ethics committee commented. "This is a modern method to get at the information we need."

DP Chiefs Seeking to Rise in Firm Said to Have Unique Advantages

By a CW Staff Writer

NEW YORK — "Systems and DP executives who can join the performance elite have an unusual opportunity to move ahead to new responsibilities," according to Robert L. Crandall, who moved out of DP to become senior vice-president for finance at American Airlines.

Crandall, who acknowledged the role of luck and opportunity in making such transitions, said "performance is the key" for any DPer who wants to move up within a using organization.

But the systems or DP executive, he said, has two great advantages in upward movement that aren't available to other executives in a firm.

First, he explained, the systems executive interfaces with many functional parts of a company so he should have a wider knowledge of the firm than executives with a more narrow functional outlook.

Secondly, the DP executive "controls

the resource that has the greatest potential in improving the productivity of the corporation and contributing to increased profits," Crandall said.

Expectations Gap

DP managers have a great opportunity today, he said, to improve their position because of the gap between the expectations of management for DP and what DP is actually producing.

"There is a real opportunity for those executives who can help to close this gap," Crandall continued.

Overall, he said, the role of systems executives in a corporation today is no longer different from the role of other executives, since the systems man is "now expected to aid in solving business problems and not just technical problems."

The DP manager, however, faces certain problem areas that must be overcome, he said.

First, the DP manager is dealing with a rapidly changing environment and must organize to interface effectively with users in the organization — a job that is often hard for strict technical people.

The DP executive "controls the resource that has the greatest potential in improving the productivity of the corporation and contributing to increased profits" — Robert L. Crandall

"The people you send to talk to users must be appropriate," he warned, noting this contact with users could often help give the appearance of successful operations.

Secondly, Crandall believes, planning is particularly important to the DP function since "mistakes can be extremely expensive" and the price tag on planning will get even higher in the future.

Besides the expense, he noted that failures in meeting plans both with the DP systems and their executives cause disillusionment among the top-level executives of the firm.

But at the same time he warned against taking "too narrow a view of planning" — instead indicating that the systems man should aid management in setting priorities for all projects that involve systems throughout the corporation and not just plan for the DP operation itself.

The third area the systems executive must watch concerns the selection and motivation of people, Crandall indicated, since good performance depends on good people.

To do this, the DP manager should emphasize training to show his people opportunities both within the DP function of a company and in other parts of the company, and should emphasize the non-DP side of the department, "which is solving business problems."

The CICS audio-visual course.

CICS is one of the great advances in software packages, and is becoming increasingly important to users of data base/data communications systems.

To help train programmers get the most from CICS, EDUTRONICS, in conjunction with the leading CICS consultants, has developed a unique audio-visual course. Called "CICS APPLICATIONS PROGRAMMING," it is a carefully designed, completely integrated overview of CICS and its operations.

In either film or video tape, the new course covers all the components, relationships and interfaces created by CICS. Our student workbook paces the programmer through every element of CICS, insuring maximum interaction and retention of knowledge.

The new CICS course from EDUTRONICS is available immediately, with a special introductory price of only \$1175.

Call your nearest EDUTRONICS office or write for a demonstration of the CICS course. It's available *only* from EDUTRONICS. The people who make good programmers great.

Get it from edutronics.

See us at the NCC, booth #926.

edutronics
systems international, inc.

3435 Broadway, Kansas City, Mo. 64111

also in London and Paris

A Coleman **CA** American Company

Boston (617) 245-6980
Chicago (312) 787-1722
Dallas (214) 233-9166
Kansas City (816) 756-1333
Los Angeles (213) 380-7811

New York (212) 421-4610
San Francisco (415) 989-0417
Toronto (416) 484-1992
Washington, D.C. (202) 223-2614
Winnipeg (204) 786-1434

360/30
For Sale Or Lease

With or without
I/O Set

Available Now
Contact D.R. Tebo
(315) 474-5776

Will Sanders Sue IBM Next?

By E. Drake Lundell Jr.
Of the CW Staff

SACRAMENTO, Calif. — Even though IBM is not mentioned by name, it stands charged of illegal activity in the recently filed Sanders Associates suit against the State of California over the award to IBM for the Teale Consolidated Data Center (see story, Page 1).

This may well mean that a Sanders suit against IBM is not far behind.

In the suit against the state government and the officials in charge of the procurement process, Sanders charged that the contract the state made with IBM is

Analysis

illegal since the state officials "condoned" an illegal tying arrangement forced on them by IBM.

Therefore, several legal sources said last week, Sanders could just as well accuse IBM of using illegal tying arrangements in a suit brought under either the Sherman or Clayton antitrust acts — or both.

So why isn't Sanders suing IBM and not the state for illegal activities?

According to several sources, Sanders and IBM are presently negotiating an agreement that could preclude such a suit.

These sources indicate that when Sanders first threatened to sue IBM over the Teale award, IBM quickly agreed to support Sanders' 2260-type terminals on the 370 as well as the 360, even though IBM previously had withdrawn support for the 2260-type systems on 370 equipment.

IBM continues to claim that the support was not offered as a sop to keep it out of the courts, although Sanders admits it made its complaints about lack of support known to IBM before the decision to sue the state.

Lawyers for the two firms are reportedly still talking, with Sanders claiming it deserves some redress for the damage done to it by the IBM announcement of withdrawal of support.

In addition, Sanders is also said to be concerned about the fact that IBM is integrating more and more functions into the mainframes needed to operate terminals which is making interfacing of terminals with IBM computers more difficult.

If Sanders does go to court with IBM, it would indicate a whole new industry segment entering the legal arena against the industry leader, because to date the terminal manufacturing portion of the industry has not seen itself damaged by IBM and therefore has filed no legal actions.

The peripherals makers, leasing companies and mainframe manufacturers have all been represented in the growing IBM suit business. Perhaps Sanders is getting ready to lead a parade of terminal makers into the same arena.

IBM Director Resigns

NEW YORK — Donald S. MacNaughton has resigned as a director of IBM "to avoid a conflict of interest."

MacNaughton, chairman and chief executive of Prudential Insurance Co. of America, indicated in a memo to Prudential officers that he resigned because Prudential, which has an investment of about \$20 million in a Memorex subsidiary as well as common stock in Memorex, has a lien on any proceeds which may be received from litigation filed against IBM by Memorex.

The resignation was effective last Dec. 28, and was disclosed in an IBM notice to stockholders about the annual meeting which is scheduled for April 29 in St. Louis.

Through Use of Semis, Calculators

Panel Sees Computing Costs Declining

By Molly Upton
Of the CW Staff

NEW YORK — Advances in technology, such as semiconductor memory, and more astute use of less costly devices such as calculators, should bring the cost of computing down over the next several years, according to panelists at an IEEE Intercon session.

On the design front, A.C. Markkula Jr. of Intel Corp. predicted that future systems costs may be reduced by as much as 40%, depending on the type of memory and system configuration.

"Use of semiconductor memory components will lower the overall system cost over the next several years," Markkula said.

Future projections show the typical cost/bit in overhead and components falling in the 1 μ sec core; P-channel dynamic, .5 μ sec; N-channel dynamic, 80 nsec; and lowest of all, the N-channel dynamic, .3 μ sec types of memory.

Rex Rice, director of technology for the Fairchild Commercial Group, said as system costs were being reduced through increased use of integrated circuits, so were access times of main memories, since switching speeds of logic circuits were going up. This meant "we could get many more computing operations in the same time period also coupled with reduced hardware costs," he said.

LSI silicon components have reduced hardware costs to where "we have 'calculating power' purchasable in department stores," Rice said, and "we are on the threshold of providing mass-produced, very low-cost 'computing power' by the coupling of the following items:

- "MOS LSI 'calculator' and 'memory' technology.
- "'Macro' functional and control algorithms in Prom/ROM hardware or in RAM/magnetic memory) combinations.

Fear of Foreign Investment In U.S. Called Overreaction

NEW YORK — U.S. firms are overreacting when they fear the "foreign thrust" into the U.S. markets by firms from abroad, said Bernard Mayer, group vice-president of Siemens Corp.

When we consider that the size of the foreign investment in the U.S. is minimal in comparison with the size of U.S. investment abroad, we see how irrational our fears of foreign marketing activities here really are, he said.

Commerce Department figures indicate direct foreign investment in the U.S. totals \$14.4 billion or less than one sixth of the \$94 billion of direct investment abroad by U.S. companies, Mayer added.

Mayer told attendees at an IEEE session on the Foreign Thrust to Capture U.S. Markets, "We can't be for strengthening U.S. investments abroad and at the same time protectionist about overseas investments here."

While essentially agreeing with this philosophy, A.R. Schroter, vice-president international of Rockwell International's Electronics Group pointed out that free trade is "supposed to be a two-way street."

He observed that in some countries, U.S. firms find a "whole network of barriers to our products and our investment."

U.S. industry's answer to Japan and Germany might be, "If you want to fight for our markets, you've got to let us fight for yours. U.S. industry is not going to roll over and play dead. We are going to use every scrap of technological know-how we can muster to cut our costs, improve our techniques and build better

- "Incorporating programmable features on calculator-based systems.

- "Incorporating automatically managed virtual main and file memory on

IEEE INTERCON

calculator-based systems.

- "Providing hard-copy output to the calculators.

- "Providing communication link interfaces."

Rice said "hardware costs have fallen so much that we must reexamine our traditional ideas of centralizing processing by time-sharing over large communication networks."

'Specialized' POS Opportunities Exist for Smaller Organization

NEW YORK — While large corporations fight over the lion's share of the point-of-sale (POS) market, opportunities for smaller organizations exist in specialized product and/or market sectors that are too small for a major POS or electronic cash register terminal vendor to pursue, Thomas F. Horan of Stanford Research Institute advised IEEE Intercon attendees.

While most of the activity within the POS field has occurred in the area traditionally occupied by the higher priced (over \$2,500) data capture devices, the electronic cash register (ECR) will impact the market significantly, Horan noted.

During 1974 and 1975, "the entire price spectrum of available electromechanical

But while hardware costs have declined, in general software costs have risen, Rice noted.

As examples of what can be done to control software costs, he cited the conversion of algorithms to firmware, use of microprogramming, and even hardwiring of software "system" controls such as in the Symbol system at Iowa State University.

Thomas L. Osborne of Hewlett-Packard observed that the pocket calculators are helping the user bring down computing costs.

"Many problems that are now being evaluated on higher cost alternatives are candidates for programmable calculators like the HP-65. As problems migrate to the lower cost alternate so must cost of computing decrease," he said.

cash registers will be matched by electronic devices. Competition will undoubtedly be at an even higher level than it is at present. No problems of installation, training, software development, etc., will exist in the ECR area as it exists in the upper end of the market.

Projections call for total demand for POS registers of all types, both electromechanical and electronic, to be 50% higher by 1980, or about 150,000 units per year, than at the beginning of the decade, he said.

Demand for POS units of the data capture type will grow from one half of total POS demand in 1970 to two thirds by 1980, Horan said.

Horan suggested areas in which firms may find opportunities relating to POS:

- Portable hand-held scanners to assist retailers in performing various inventory control and data entry functions.
- Automatic pilferage detection devices.
- Software systems development for retailers for which a great deal of support will be required.
- Applications of scanners and machine-readable tags and labels to manufacturer's production, distribution and inventory processes.
- Service bureau operation providing on-line or off-line support for retailers' POS systems.
- Service bureau creation of machine-readable tags and labels.
- Designing custom POS systems for special retail application areas.

and better products, cheaper and cheaper," Schroter suggested.

Fair Rate of Return

One of the reasons foreign firms expand into world markets is to get a fair rate of profit on products resulting from high R&D costs, Mayer said.

He said Siemens is such a world company and being part of an international firm offers other advantages such as access to and exchange of information and greater security against localized economic hardship.

'Investigate Marketing Abroad'

NEW YORK — "Selling electronic components and equipment in overseas markets could possibly become the most profitable marketing opportunity your company has in the years ahead," Kenneth C. Moritz, vice-president of C. Tennant, Sons & Co. told attendees at the IEEE Intercon session on new international markets.

However, the decision to operate abroad should be based on some sound market investigation, he said.

Exports of communications and data processing equipment accounted for nearly one third of electronic exports in 1973, or \$1.1 billion of more than \$3 billion total, Moritz said.

The DP and communications figure represents a 19% increase over 1972, he added.

Moritz advised attendees to enter markets selectively, approaching mar-

kets with the greatest potential first.

One needs to know price competitiveness, real size (noncaptive segment) of the market, and delivery requirements and ability to meet them.

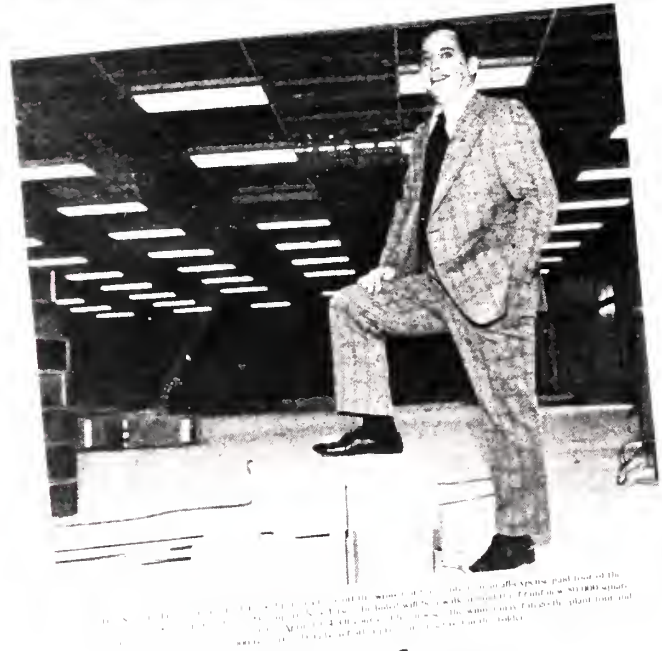
In addition, such factors as nontariff barriers should be assessed for they may cause one to decide to begin in a different market.

Where local foreign industry is protected by a nontariff barrier, special import certificates can be required on goods — which takes time to procure from the foreign government — before satisfying U.S. licensing procedure.

"There is much intimate information you will require to make a sensible decision as to whether your product can be sold. Some facts are obvious, such as price and delivery; some are obscure, such as nontariff barriers," Moritz said.

FOR LEASE or SALE
256K 360/40
also available as 128K or 192K
Two Serial Channel, Decimal Arithmetic, Floating Point Arithmetic,
Storage Protect, And 1052-7 Console
READY TO SHIP
Outstanding Lease Plan, Or Outright Purchase
Member Computer Dealers Assoc.

LUNCEFORD & ASSOCIATES Valley View Bank Bldg.
(913) 381-7272 Overland Park, Kan. 66212



Win a free
Interdata plant tour
or \$1,000 in cash.
(Or many other prizes.)

100 winners in all.
Prizes from \$10-\$1,000.
Get the details at the Interdata Booth
The Computer Caravan in St. Louis, Apr. 3-5
Chase Park Plaza Hotel

'All Turned Upside Down'

IBM Blasts Telex Appeals Brief

DENVER — The Telex brief to the Circuit Court of Appeals here "has law, economics and normal business conduct all turned upside down — competition is Telex's enemy and it is from competition that Telex seeks to be protected," IBM charged last week.

In a reply to the Telex appeals brief [CW, March 27], IBM charged, "Telex nowhere recognizes the legitimate thrust of competitive intent. Instead it seizes the marks and indicia of legitimate competition and labels them 'predatory.'"

'Supports IBM Contention'

The IBM reply brief said the Telex brief in fact supported IBM's contention that the decision in the antitrust suit should be reversed by the Tenth Circuit Court of Appeals here.

The Telex findings in its brief "attack (without saying so) the basic findings," IBM said, adding that Telex "offers no legal foundation for the judgment either on the findings or on the new claims Telex now submits."

The legal theories put on the record by Telex "are wrong" when taken separately, IBM said. "However, the abandonment of precedent, the attack on competition itself, the dangers for the future and the injustice of the result stand out most starkly when the legal theories scattered through Telex's brief are considered as a whole," IBM added.

The Telex legal theories, IBM said, "are an attack upon competition and an assault on the very heart of the Sherman Act."

The philosophy that underlies the Telex contentions and the district court's decision against IBM contains "error," IBM said, because "it is at war with the competitive system."

"With such a perspective, anything IBM did to compete was wrong. A view which holds competition itself is wrongful leads to labeling IBM as a 'predatory' company with 'predatory' objectives," the IBM brief continued.

'Normal Conduct'

The findings in the case clearly

indicate, IBM said, "that IBM faced with accelerating business losses, necessarily reacted to competitors' lower prices and better terms with its own lower (profitable) prices and better terms. That is normal business conduct and a legitimate business purpose."

In addition, IBM charged that Telex distorted the internal IBM documents introduced into the record, claiming they really show that "IBM did not have an intention to eliminate competitors."

"It is equally plain, we submit, that if IBM had a 'bad' subjective intent Telex would not have been forced to attack and ignore the findings and to miscite and distort the record as it has," the brief said.

IBM Adds to Its Appeal Of Contempt Citation

WASHINGTON, D.C. — IBM has filed a supplemental appeal with the Supreme Court adding to its protest against the \$150,000 per day contempt ruling handed down against it by Chief Judge David N. Edelstein in the Federal District Court for the Southern District of New York.

IBM has already appealed the contempt citation per se, but the supplemental appeal protests

Edelstein's rejection of an IBM motion to enter the contempt citation just against its lawyers and not the firm itself.

The contempt citation — which has been stayed pending outcome of the appeal — was levied because of IBM's failure to turn over certain documents to the Federal government in its antitrust case as ordered by Edelstein.

At the time, IBM lawyers had contended that they, and not the company, should be held in contempt while the issue was taken to higher courts for ultimate resolution and that a light fine, possibly \$100 daily, should be levied in the matter.

However, Edelstein found the company in contempt and ordered the larger fine.

"These actions," the IBM filing to the Supreme Court said, "would compel IBM and its counsel Cravath to forego their attorney-client work product privileges upon the fiat of a federal district judge, acting contrary to decisions of this court, of its own court, and of many other federal judges on the same facts."

Edelstein's actions "create a precedent which disrupts the orderly administration of justice — a precedent which the district judge seeks to protect from reversal (*sic*) by attempting to preclude all routes to appellate review," the brief said.

GA Names 4 Divisions

ANAHEIM, Calif. — General Automation, Inc. has named four product line marketing groups to divisional status: Production Machine Control, 18/30, Special Systems and Communications.

"These new organizations are in line with the company's early plans for long-term growth in high-growth vertical markets," explained President Raymond J. Noorda.

We know the ropes

In Financial and EDP Occupations.



Assuring you the right person for the job and the right job for the person.

We have specialized in Financial and Data Processing employment for over a quarter of a century, and frankly, we're good at it.

World's largest Financial & EDP Personnel Specialists

Alexandria, Va.	5001 Seminary Road	(703) 921-3600
Allentown, Pa.	Hotel Taylor Bldg.	(215) 439-1506
Atlanta	3379 Peachtree Road N.E.	(404) 232-2416
Baltimore	The Quadrangle, Cross Keys	(301) 323-7770
Boston	140 Federal St.	(617) 473-6440
Charlotte	4801 E. Independence Blvd.	(704) 525-3270
Chicago	333 N. Michigan Ave.	(312) 782-6930
Cincinnati	606 Terrace Hilltop	(513) 621-7711
Cleveland	1367 E. 6th St.	(216) 621-0670
Dallas	2001 Bryan Tower	(214) 742-9171
Denver	1612 Court Place	(303) 244-2925
Detroit	670 Honeywell Center, Southfield	(313) 559-1212
Hartford	111 Pearl St.	(203) 278-7170
Houston	1200 Central Nat'l Bank Bldg.	(713) 228-0056
Indianapolis	9 N. North Illinois St.	(317) 636-5441
Kansas City, Mo.	127 West 10th St.	(816) 474-4583
Lancaster, Pa.	R. North Queen St.	(717) 299-5621
Long Island	420 Jericho Turnpike, Jericho	(516) 822-8080
Los Angeles	3600 Wilshire Blvd.	(213) 386-6805
Louisville	600 South 4th St.	(502) 589-6657
Memphis	12 S. Main St.	(901) 523-8950
Miami	1190 N.E. 163 St., N. Miami Beach	(305) 947-0684
Milwaukee	777 East Wisconsin Ave.	(414) 271-9380
Minneapolis	80 South 8th St.	(612) 336-8636
Newark	1180 Raymond Blvd.	(201) 623-3661
New York	330 Madison Ave.	(212) 986-1300
Omaha	7101 Mercy Road	(402) 397-8107
Orange, Cal.	500 South Main St.	(714) 835-4103
Philadelphia	2 Penn Center Plaza	(215) 568-4580
Phoenix	1517 Del Webb TowneHouse	(602) 279-1688
Pittsburgh	Gateway Towers	(412) 471-5946
Portland, Or.	610 S.W. Alder St.	(503) 222-9778
Providence	400 Turks Head Bldg.	(401) 274-8700
St. Louis	7733 Forsyth Blvd., Clayton	(314) 727-1535
San Francisco	111 Pine St.	(415) 434-1900
San Jose	675 North First St.	(408) 293-9040
Seattle	1215 Fourth Ave.	(206) 624-9000
Stamford, Ct.	111 Prospect St.	(203) 325-4158
Tampa	1311 N. Westshore Blvd.	(813) 876-4191
Washington, D.C.	7316 Wisconsin N.W.	(301) 652-1960
Wilmington	1102 West St.	(302) 652-3244

London, England, 17 Finsbury Square 01 638-4394
Toronto, Canada, 15 Toronto St. (416) 858-1314
Vancouver, B.C., 535 Thurlow St. (604) 688-7726

ROBERT HALF PERSONNEL AGENCIES

What's The Outlook For The Computer Industry In

JAPAN

NOW... And In The Crucial Months Ahead?

Timely FREE SPECIAL REPORT

Answers These
And Other Vital
Questions About
The Fast-Changing
Japanese Computer
Industry!

As an alert executive aware of the growing importance of the international computer industry, now more than ever, you need

Japan is the largest computer market outside the U.S. with over 15,000 computer installations worth \$5 billion and projections indicate the Japanese market will grow 25%-30% a year

BUT...

- What about the effects of the current energy crisis on Japan's computer industry?
- Will the relaxed restrictions on Arab oil supplies to Japan and the fact that Japan has exempted data processing from oil restrictions mean no cut in computer activity?
- How about the impact on mainframe makers? Investment restrictions? Japan's credit squeeze? Power cuts? Effect on computer production? Commodity shortages? Replacement demand? The effect on Japan's economy? U.S. imports and exports from and to Japan? What it all means to YOU?

EDP Japan report

The bi-monthly newsletter Airmailed to you from Tokyo to keep you informed of the rapidly expanding changing Japanese computer industry

EDP Japan report

Published in Japan By
International Consulting Corporation
An Affiliate Of

INTERNATIONAL DATA CORPORATION
Publishers Of COMPUTERWORLD
60 Austin Street, Newtonville, Massachusetts 02160

Please send me EDP Japan Report for the next three months (6 issues) for only \$20, a saving of \$4.50 on the regular \$98 annual rate. Include, without extra charge, your 12-page Special Report, "Effect Of Oil Crisis On Japan's Computer Market."

☐ Bill company ☐ Bill me ☐ Check enclosed ☐ Purchase order enclosed
Signature _____
Name _____
Title _____
Organization _____
Address _____
City _____ State _____ Zip _____

You Are Invited
To Accept This
SPECIAL
TRIAL
SUBSCRIPTION
OFFER
3 Months For \$20
Saving \$4.50 On The
Regular \$98 Annual Rate
INCLUDING THE
FREE
SPECIAL REPORT!

Syncom Polishing Packs, Preparing for Disk Market

By Molly Upton

Of the Computerworld Staff

BUFFALO, N.Y.—Syncom, Inc., which has been a supplier of tapes for some time, is entering the disk pack market with both used and new packs.

"We think it's a good market," explained President Miles D. Bender.

"We feel that both from a leasing and sales standpoint the market has a long way to go. A lot of the shakeouts have been seen," he added.

"The time in the next four to five years is good, based on the cost of the packs today compared with what they were three or four years ago," Bender noted.

Prices on new disk packs have plummeted, he pointed out. A 2316 pack that cost about \$600 when first produced now sells for around \$160. Now a 3336 costs about \$600, he noted.

"I think the reason the DP business has had such a tough time with the pricing coming down is because it started out and tried to rob everybody. The prices were

way too high in the beginning," he said.

Refurbishing Old Units

Syncom has been buying used packs from large installations upgrading their disk facilities, which it has then refurbished and recertified.

"The total investment is small compared with the lease price available," he explained.

"Whereas five or six years ago packs were costing \$500 to \$600, we can buy these packs now for between \$30 and \$80," he said. Refurbishing costs about \$30 to \$40 a pack. Monthly rental for a 2316 is about \$8.50, which means a payback in about 14 months, Bender observed.

To refurbish the disks, Syncom checks the packs for balance and axial and radial runouts, which determine whether the plates themselves are off balance. Then the packs are run through a test program to detect drop-ins and dropouts, and defective plates are replaced, Bender noted.

Internal parts are replaced as needed.

"About 80% of the disk pack market is leased," Bender estimated. Probably the smaller packs—the 2315 cartridges—are mostly a sales business, but the 2316 and the 1316 are leased, and even the new 3336 is becoming a lease market, he noted.

Bender estimated the annual revenues from the leased disk pack business to be substantially over \$100 million.

The lease market is strictly a used pack market, he explained. "The first guy who gets the pack might have a new one, but seven years later, that pack is still out somewhere. It's brought in, cleaned and recertified, but it's essentially a used pack."

The lease periods are generally 90-day minimum with 30-day cancelable, he said, noting long-term leases generally are not popular with users.

Syncom will sell used packs under the name of Syncom. Syncom also will sell and lease new disk packs.

Consolidated to Sell in U.S.

TORONTO, Ont.—Consolidated Computer, Inc., which has been concentrating efforts on OEM sales abroad, plans to market its key-to-disk products directly to the U.S. and Canada in the near future.

Financial support from the Canadian and Ontario governments will enable the firm to engage in lease financing in North America.

Up to \$10 million will be available in additional operating funds during 1974; \$3 million has already been received, the firm said.

Consolidated Computer's new products, the Key-Edit 50 and Key-Edit 1000, have not been introduced to the North American market.

The firm currently markets on an OEM basis through Fujitsu, International Computers Ltd., and Ecodata, a distributor in Brazil.

The firm will be developing a plan jointly with the General Adjustment Assistance Board and with the Ontario Development Corp. to convert a substantial portion of the existing term debt into equity.

Consolidated Computer also announced

Bunker Ramo Sets Reorganization Plan

TRUMBULL, Conn.—Bunker Ramo Corp. has completed the consolidation of the Information Products Division and Information Services Division into the Information Systems Division.

The new division will have three prime profit center departments: Brokerage Systems, Commercial Systems, and Savings Bank Systems.

The Brokerage Systems Department will handle BR's stock, bond and commodity information systems, including communications networks.

The Commercial Systems Department will be responsible for general-purpose terminal systems with special emphasis on commercial banking systems. The Savings Bank Department will handle equipment for mutual savings banks, savings and loan associations and credit unions.

Contracts

Analytical Systems Engineering Corp. has received a \$49,000 contract to develop a vessel traffic system simulation facility design for the U.S. Coast Guard.

Educational Data Systems has been awarded a \$250,000 contract from KMS Industries for EDS-8 multiplexers.

British Airways has assigned United Airlines American marketing rights to its computerized passenger check-in system.

Norway's major commercial banking group, Integrert Databehandling A/S (IDA) has signed a contract with Norsk A/S Philips for a PTS 6000 bank terminal system, including 370 P800 terminal computers and about 1,100 inquiry terminals.

Advanced Memory Systems is supplying Telefunken with an add-on memory for the Telefunken TR 440.

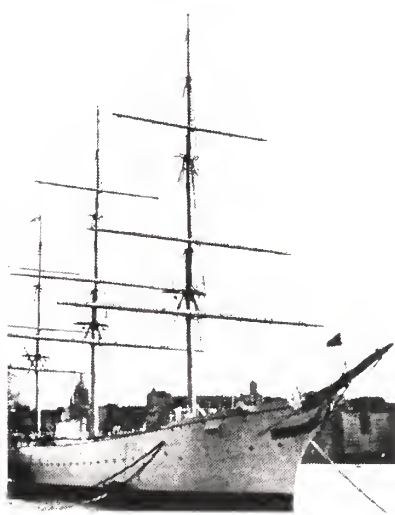
Don't Miss the Boat

Apply now for your '74 NCC "Everything Card"

If you missed the boat on the first annual National Computer Conference & Exposition last June, don't let it happen again. The first NCC in New York received accolades from attendees, exhibitors, and the media. The '74 NCC, even bigger and more comprehensive, will be held in Chicago's McCormick Place, May 6-10. And if you preregister before April 22, you'll be entitled to the '74 NCC *Everything Card*, your passport to all exhibits, program sessions, and a variety of special events.

You get much more with your *Everything Card*—special discounts for the NCC luncheons, your copy of the NCC Proceedings, plus the opportunity to make your hotel reservations at reduced convention rates. You'll also be in the running for a one-week trip for two from Chicago to Stockholm, Sweden for the IFIP Congress '74, August 5-10 or for one of five NCC lifetime registrations.

Just \$50 and the attached coupon is all you need for your personalized *Everything Card*. The '74 NCC brings it



all together, including: ■ The world's largest display of computer hardware, software, peripherals, and services presented by more than 250 exhibitors in over 800 booths ■ 117 program sessions, focusing on computer science and technology and the appli-

cations of data processing in 10 major user areas ■ Major addresses by prominent industry and professional leaders including John D. deButts, Chairman of the Board of AT&T, C. W. (Clancy) Spangle, Executive Vice President of Honeywell Inc., and George Glaser, AFIPS' President

The '74 NCC is your one chance to examine virtually every data processing product and service at one time, in one place. You'll exchange information with 35,000 of your colleagues at the computer industry's single national forum for users, managers, and computer professionals. You'll be able to help solve your own specific data processing problems by evaluating competitive products firsthand. Many of these will be on display for the first time.

To receive your personalized *Everything Card*, plus complete housing information, send \$50 by check or money order with the preregistration coupon to '74 NCC, c/o AFIPS, 210 Summit Avenue, Montvale, New Jersey 07645.

'74 NCC, c/o AFIPS, 210 Summit Ave., Montvale, N.J. 07645

☐ Yes, send me my *Everything Card*. I've enclosed \$50, covering the '74 NCC program and exhibits, plus preregistration benefits described above.

☐ Just send me all the facts.

☐ My company is interested in exhibiting at '74 NCC.

Name _____

Title _____

Company _____

Street _____

City _____

State _____

Zip _____



'74 NCC The Biggest Computer Show on Earth



FOR SALE

360/50 I (512K)

3 Channel
AVAILABLE NOWContact: D. R. Tebo
(315) 474-5776

Two 2311's
\$150 ea. per mo.
6 mo. Lease
Avail: Immediate
**COMPUTER
MARKETING INC.**
7704 SEMINOLE AVE.
MELROSE PARK, PA. 19126
(215) 635-6112

2260 **DUCS** 3270

DUCS VI (Display Unit Control System - Version 6) is a fully loaded access method which supports both IBM 2260 and 3270 displays operating under DOS or DOS VS. A simulation feature permits programs written for 2260's on previous versions of DUCS to be executed on 3270's. No program changes are required by the user.

DUCS VI provides a new and unique Format Facility and Mapping Facility which provide a simple, convenient method of using all of the 3270 enhancements including full field manipulation, selector light pens, operator id card readers, etc.

DUCS VI interfaces with problem programs written in COBOL, PL/I, FORTRAN, or Assembler Language. Programmers using DUCS VI do not need any knowledge of Assembler Language.

DUCS VI requires minimal core (2K to 6K) for either 2260 or 3270 support and is easily installed by any DOS or DOS VS user. Those considering CICS should investigate DUCS VI before commitment.

DUCS VI is a licensed Program Product available from C.F.S. Inc. on monthly, yearly or one time lease. Basic DUCS VI including both local 2260 and local 3270 support is leased for \$75.00 per month. The optional 2260/3270 simulation feature of DUCS VI leases for an additional \$15.00 per month. The optional remote 3270 support of DUCS VI (available 2nd quarter, 1974) leases for \$55.00 per month. Special yearly or one time lease rates are available.

Send requests for DUCS VI to C.F.S. License agreements along with detailed information will be sent by return mail. Inquiries may be directed to Mr. Richard F. Goran.



C.F.S. INC.
BROOKLINE,
(617) 731-3474

POST OFFICE BOX 662
MASSACHUSETTS 02147
TELEX 94-0285

You're not getting good management information

You need usable information to measure, control and improve your systems performance. Information on which solid management decisions can be made. Decisions supported by facts.

Quantitative Computer Management (QCM) will give you that kind of management information. You'll know the real productivity of your total system, the actual costs of every job, and of O/S. QCM goes beyond SMF.

QCM actually improves performance while operating.

When your system is active QCM will time each and every activity of all hardware and software in your system. This information is reported in meaningful terms and in either numerical or graph form. QCM includes education and continuing support to help you get the maximum benefit from QCM's precise information.

Good management information is available, now!

QCM

**DUQUESNE
SYSTEMS INC.**

Suite 1511/355 Fifth Avenue/Pittsburgh, Pa./15222/412-281-9055

PB's POS Exit Laid to Loss of Market

NEW YORK - Loss of marketing and technological advantages in the point-of-sale market and the resulting expectations of no more than a minor share of the market were cited as reasons behind Pitney Bowes' decision to withdraw from the field, President Fred T. Allen told a New York meeting of security analysts recently.

The decision to write off \$37 million after applicable income tax recovery resulted in a loss of \$22.4 million or \$1.76 a share - the firm's first loss in 54 years.

Allen explained that the POS market looked enticing when the firm formed Pitney Bowes-Alpex in 1970.

The PBA system "appeared to offer many advantages to the retail industry... had advantages over competitive systems then available or being tested,

and... was a leader in the market," he said.

PB, Allen said, "was able to help financially, had an in-place service organization, and a leading role in the retail price-marking, and product and customer identification market."

During the first two years orders were booked "at about the level of our expectations. However, PBA's progress in solving engineering, manufacturing and other startup problems was slower than expected, and resulted in the necessity for an additional \$8 million investment by its parents in 1971 and early 1972.

"By the spring of 1972, the rate of new order increases had begun to fall off, as did customer confidence in Pitney Bowes-Alpex," Allen related.

PB then insisted on a greater role in the management of the joint firm, and as a precondition

for providing \$12 million, gained equal representation on the board.

"By the spring of 1973, it became clear that, despite some improvements, PBA would not meet its budgeted production and income goals, and operating losses would continue at least through 1973," Allen said.

When PB assumed control of the firm in 1973, it undertook a reappraisal of the firm's prospects.

"That appraisal showed that, because of a number of recent developments, including competitive conditions, losses would have continued for the foreseeable future, and substantial investment for new product development and working capital would have been required before operations could have become profitable," Allen remarked.

Efforts to procure a partner were fruitless, as was the attempt to sell the total business.

Two lawsuits have been filed in the wake of the discontinuance of the firm: one by Alpex Computer Corp. and one by an Alpex stockholder.

The Alpex suit, Allen said, claimed PB orally promised to finance PBA to an unlimited extent. "Such claimed oral statements, which are contrary to the terms of our agreements, were never made. There is no basis for this suit," Allen said.

The other suit is based "on approximately the same grounds as the Alpex suit," he said.

Although PB may have withdrawn from the hardware end of the POS market, the firm expects subsidiaries in related areas to benefit from POS.

The Monarch Marking Systems subsidiary "should continue to increase its sales of equipment and supplies" to the POS market, he said.

In addition, PB expects that self-service banking, using magnetic-striped cards, will advance quite rapidly, and the market for more sophisticated cards will be to the advantage of its Malco Plastics subsidiary, which has over 40% of the plastic credit and identification card market.

Terminal Market Called Healthy, Wider Usage to Continue Growth

HOUSTON - The terminal market is healthy and is likely to experience continued growth for a number of years, according to a distributor here.

Thomas W. Moore, president of Tel-Tex, is looking for very strong, rapid growth in the marketplace, especially among common carrier users.

"These users are beginning to use their terminals as computer terminals as well as for communications," he said, "and as they realize the potential of the equipment, the demand increases."

50% Yearly Growth

Tel-Tex, which is celebrating its fifth year in the business, has been growing at an annual rate of better than 50% over the last four years, Moore said. "And the signs indicate this year will be equally as good," he said, "and this is only for the traditional machines."

Tel-Tex currently markets CD1, Techtran, Di-an, Teletype, MI³ and Novation equipment, ranging from portable terminals to acoustic couplers.

TWX, Telex Users Sought

A big boon to the business is TWX and Telex users, Moore said. "Western Union not only

allows its users to connect outside equipment, but encourages the practice," he stated, noting that Western Union had decided to concentrate on providing communication service, rather than terminal equipment.

"This has made a big difference for us in the last six months," he said.

The time-sharing computer terminal market is also growing at a healthy rate, he said.

Timesharing Market Grows

In fact, he said, time-sharing companies are approaching distributors to handle their overflow when equipment demand outruns supply. "It only makes good sense," Moore said, "since they can't sell time unless a terminal is installed."

The teletypewriter terminal user is also changing, according to Moore. Whereas the engineer was using a TTY before, today he is using a CRT, and the schoolteacher has taken over the TTY to teach third graders mathematics.

LOW-PRICED acoustic coupler

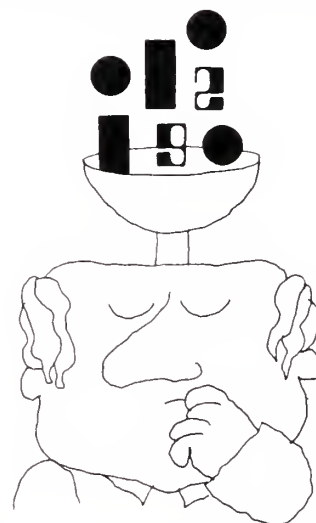
MODEL 150 . . . NO FRILLS

- For use with all Series 33 TELETYPE Terminals.
- Half/full duplex switch.
- Carrier indicator.

\$147



COMDATA member of IBM
7544 West Oakton Street
Niles, Illinois 60648
Phone: 312/692-6107



Need Input on IBM 360?

Call Tony Pettine (609) 424-3344 for Leasing Information
Immediate Availability

MDX
Corporation

26 Springdale Rd., Cherry Hill, N.J. 08003
(609) 424-3344 or (215) LO4-3322

Offices: Cherry Hill, N.J.; Columbus, Ohio; Philadelphia, Pa.; Washington, D.C.

Keyscan Withdrawal Cited In Inforex Quarter Loss

BURLINGTON, Mass. — Withdrawal of the Keyscan system, plus other adjustments contributed to a fourth quarter loss for Inforex, Inc., even though earnings were up for the year.

Inforex reported a loss of \$1.1 million on revenues of \$10.5 million in the quarter, compared with a profit of \$693,000 or 27 cents a share on revenues of \$7.3 million a year ago.

The company cited effects of currency translation due to the strengthening of the dollar in foreign trade, higher interest rates and the buildup of preproduction engineering and marketing expenses for new products, including the recently withdrawn Keyscan.

The principal adjustment was a provision of \$500,000 for loss on the Keyscan withdrawal.

Earnings for the year were up, however, to \$1.4 million or 53 cents a share from \$1.2 million or 51 cents a share a year ago.

Revenues rose 63% to \$37.7 million from \$23.1 million in 1972. Rental and service revenues of \$16.5 million were 85% of last year's figure.

Commenting on the results, Chief Executive T.C. Cronin said

...Toward the Bottom Line

National Cash Register Corp. is scheduled to change its name to the NCR Corp. The proposed change is subject to stockholder approval at NCR's annual meeting in Baltimore on April 17.

SSS

Despite a 20% increase in advance bookings for 1974 and mid-1975, Litton ABS said the "energy crisis" will not affect its ability to fill orders and maintain standard delivery schedules for OEM products.

SSS

Data Products Corp. has consolidated its name and will now be known as Dataproducts Corp.

SSS

Compagnie Honeywell Bull, the French affiliate of Honeywell, Inc., reported 1973 earnings of \$23.8 million on revenues of \$481.8 million, compared with 1972 earnings of \$19.5 million on revenues of \$397.3 million.

SSS

GTE Information Systems, the data service unit of General Telephone & Electronics, incurred a \$19.9 million loss in 1973, compared with a \$227,000 profit a year earlier. The loss was attributed to adverse conditions in the securities industry market, cost overruns on new installations and reevaluation of some equipment.

SSS

Analytical Development Associates has received \$1 million in equity financing to be used to expand Mednet, a medical communications and computation service which enables physicians to send patient data over telephone lines.

SSS

Decision Data Computer has expanded its credit agreement with three banks from \$10 million to \$15 million. The additional \$5 million is available on an open line of credit.

the company was able to show an increase in its year earnings during a period of substantial investment in the expansion of its rental base and new product startup costs. He added that ongoing profits did not meet management's expectations, and that a careful analysis is being made of expenses and sources of revenue to improve their balance.

Position Announcements

SYSTEMS ANALYSTS/PROGRAMMERS

Continued growth has resulted in several openings in our systems and programming Dept. We are looking for the following:

SYSTEMS ANALYSTS — Minimum 3 years' experience in complete systems design including specification writing, client liaison, 3rd generation programming. Computerized phototypesetting experience is desirable.

PROGRAMMERS — Minimum 1 year experience in BAL on 3rd generation systems. Interesting, challenging applications.

We offer competitive salary along with a comprehensive benefit plan. Please send resume stating salary requirements in confidence to: PERSONNEL MANAGER, INTERNATIONAL COMPUTAPRINT CORP., 475 Virginia Drive, Ft. Washington, Pa. 19034 (215) 643-4940

An Equal Opportunity Employer, M/F

The City of Urbana, the City of Champaign, and Champaign County, Illinois are seeking qualified data processing consultants to conduct a feasibility study on data processing operations among the three governmental units. The study should include review of functions, procedure considerations, and operational costs. Interested parties should contact Richard M. Franks, Administrative Officer at the address below.

Richard M. Franks
Administrative Officer
400 South Vine Street
Urbana, Illinois 61801

PROGRAMMER/ANALYST

A leading transportation consulting firm has an immediate opening for a computer programmer/analyst, preferably with experience in the transportation/urban planning field in Washington, D.C. Minimum requirements: college degree (preferably Masters' degree in computer science); familiarity with FORTRAN and IBM/360 JCL; prefer person having operational familiarity with major transportation/urban planning computer packages. Desire a quick learner, with ability to communicate and willingness to expand computer language and hardware knowledge.

Salary commensurate with experience level plus participation in attractive bonus plan. Submit resume to:

L.F. Wright
Suite 1000, 1025 Connecticut Ave., N.W.
Washington, D.C. 20036

EDUCATIONAL INSTRUCTOR-EDP

An opening currently exists for an individual to fill the position of Educational Instructor in Data Processing. Qualified applicant should have minimum of 2 years programming experience in an OS/MVT environment, knowledge of COBOL and BAL, familiar with Data Base concepts and Telecommunications. Previous teaching experience helpful.

Responsibilities will include organizing and maintaining an in house training curriculum for Data Processing Staff.

Send resume and salary requirements to:

FREDERICK E. TAYLOR, PERSONNEL DEPT.
THE CLEVELAND TRUST CO.
900 EUCLID AVENUE
CLEVELAND, OHIO 44101

AN EQUAL OPPORTUNITY EMPLOYER

POSITION ANNOUNCEMENTS

PROGRAMMING INSTRUCTORS

We are looking for individuals who not only know IBM software and/or the Systems Analysis Function but who also are able to communicate this knowledge to experienced programmers. Position requires two years of data processing background and teaching experience.

We are growing rapidly with the latest IBM equipment and large data base software. We offer an excellent starting salary and outstanding benefit program. Send resume in confidence, including salary history, to:

Employment Manager
Mutual of Omaha
Dodge at 33rd
Omaha, NE 68131



People you can count on...

Life Insurance Affiliate: United of Omaha
AN EQUAL OPPORTUNITY EMPLOYER

Ittty **S**ervice
Bitty **S**ystems
Monopoly **S**ales

We're specialists in IBM "Customer Engineer" Extractions.

Salary \$1300-\$1800/month
Bill Gill
5724 W. Diversey Av.
Chicago, Ill. 60639
(312) 622-7711

And Associates

Customer Service Engineers

I have openings for over (100) "C.E." These positions are available in the major cities throughout the U.S. and Canada. Customer Engineers with experience on small or large scale computers, peripheral equipment, etc. You'll need a minimum of (2) years of experience.

Jr. CE to \$1100 mt.
CE to \$1300 mt.
Sr. CE to \$1500 mt.
Tech Spec. to \$Plus mt.
Field Mgrs. Sal Neg. mt.
Systems Analyst .. to \$1500 mt.
Salesmen Sal. Plus



AND ASSOCIATES
5724 W. Diversey Av.
Chicago, Ill. 60639
(312) 622-7711

POSITION ANNOUNCEMENTS

ASSIGNMENT IN TEHRAN, IRAN

360 OS SYSTEMS PROGRAMMERS
IMS SYSTEMS PROGRAMMERS
IMS APPLICATIONS PROGRAMMERS
STATISTICS/ECONOMICS/FORTRAN PROGRAMMERS

Send resume and salary history to:

TSC

2924 Red Lion Lane
Silver Spring, Md. 20904

OUTSTANDING SALES OPPORTUNITY

The leading producer of Corporate Financial Reporting Systems needs successful salesmen with proven track records. Hardware/software sales experience a necessity. This is an unusual opportunity to sell the World's No. 1 General Ledger and other Financial Reporting Systems. Send Resume to R.P. Paine, V.P. Marketing.

Openings in:
NEW YORK
CHICAGO

LOS ANGELES
DALLAS
TORONTO

CLEVELAND
BOSTON

SOFTWARE

Position Available

COMPUTER CENTER DIRECTOR

Responsibility for instructional and research computing at the Duluth campus of the University of Minnesota. Current hardware includes a CDC 3200 with 65K words of memory supporting a remote CDC 200 User terminal and 30 teletype terminals. Administrative experience and academic qualifications important.

Send inquires and resumes to

Search Committee
313 Chemistry Building
University of Minnesota, Duluth
Duluth, Minnesota 55812
An Equal Opportunity Employer

DATA BASE SUPPORT PROGRAMMER

Ohio's largest bank has an immediate opening for a Data Base Support Programmer. The right candidate should have at least 2 years experience in an OS/MVT environment, knowledge of assembler language and be familiar with such Data Base Systems as: TOTAL or IMS. Send resume and salary requirements to:

Frederick E. Taylor, Personnel Dept.
THE CLEVELAND TRUST CO.
900 Euclid Avenue
Cleveland, Ohio 44101

An Equal Opportunity Employer

MINI-COMPUTER PROGRAMMERS

The optimum application of programmable logic devices to emerging technological processes is the function of the Engineering Sciences Department of this major manufacturer. Personnel and facilities are totally involved in adapting commercially available mini- and micro-computer equipment to specialized "in the loop" applications. Electronic interfaces between CPU and non-standard computer and machinery system controls are designed by departmental personnel. Most software is developed at the assembly language level; real time considerations in program development are crucial.

Because of the wide diversity of our manufacturing operations, challenges... and ultimately, accomplishments... are unlimited for the innovative, aggressive programmer. If you have a firm background in mini-computer systems... are proficient in assembly language... and would thrive on involvement in far-reaching, truly challenging projects... send us your resume and letter outlining career goals and salary history today. The successful candidate can expect an excellent salary and comprehensive benefit program coupled with unmatched potential for professional advancement. Send replies to:

CW Box 4061
797 Washington St.
Newton, Mass. 02160
An Equal Opportunity Employer

POSITION ANNOUNCEMENTS

POSITION ANNOUNCEMENTS

POSITION ANNOUNCEMENTS

POSITION ANNOUNCEMENTS

POSITION ANNOUNCEMENTS

UPDATE YOUR SYSTEMS CAREER AT I.C.S.

Continuing expansion of our globally prominent educational and training organization creates an ongoing need for qualified computer professionals. Immediate opportunities are now available for:

SR. SYSTEMS ANALYST

Assume total responsibility for systems design and development. Requires at least 5 years systems design experience. Project leader experience is an asset.

SYSTEMS PROGRAMMER

Develop utility software and assist in the creation of data management systems. Requires a minimum of 2 years experience with BTAM/QTAM - DOS/OS systems and familiarity with JCL and POWER.

If you are a career-minded professional who'd like to move ahead in an environment of learning, of challenge, and of achievement, then you should look into one of these opportunities. The salary is excellent, the benefits are comprehensive, the location is ideal and the advancement opportunities are virtually unlimited. Call collect. Mr. Jack Mahoney, Director - Systems Services.

International Correspondence Schools

Scranton, Pa. 18515
an equal opportunity employer

COMPUTER PROFESSIONALS

Listed below are four new and exciting positions now available with our "Fortune 500" client, located in Upstate New York.

Sys./Analyst 19K
2-5 yrs. financial, mfg. systems with excellent communication skills. This is a corp. position leading to management. Degree required.

Sys./Analyst 16K
1-2 yrs. financial mfg. system plus a desire to grow rapidly in mfg. (degree)

Sr. Prog./Analyst 16K
3-5 yrs. strong Cobol, Bal with some exper. in mfg. T.P. desirable. Exceptional opp. to move forward. Degree

Programmer 13-15K
1-2 yrs. Cobol, Bal, PL/1 qualifies for three immediate openings with our client Co., Degree required.

Send Resume or Call:

Career Advisors

125 Wolf Road—Albany N.Y. 12205

(518) 458-1810

Our client companies assume all fees.



MANAGEMENT CONSULTING ACCOUNTING-DATA PROCESSING

The Central Florida office of an international CPA firm offers an opportunity to join its management consultant staff.

Our successful candidate will have at least 5 years experience in data processing, preferably in the area of financial systems design, EDP auditing, hardware/software evaluation and performance review.

A strong accounting background including experience in designing and installing cost accounting and budgeting systems is required. You will interface directly with our clients in solving their management problems. Therefore, you must possess interpersonal skills to deal effectively with all levels of management.

A Bachelors Degree is required. Graduate degree and CPA, CDP certification is desirable. If you are looking for a challenging career opportunity, with rapid identification of ability and accompanying advancement in responsibility and income, send your resume including salary history and requirements in strictest confidence to:

CW Box 4044
797 Washington Street
Newton, Mass. 02160

OS/360 Systems Support Representative.

If you have over 5 years' experience as an OS/360 Systems Programmer or Systems Engineer; have proven ability in making convincing technical presentations; work in an aggressive well-organized manner without a great deal of direct supervision, and like to travel, we have an outstanding opportunity for you. Positions open in Chicago, Detroit, and Washington, D.C.

Call Bob Cabaniss at (415) 983-0422

ITEL
CORPORATION

One Embarcadero Center San Francisco, California 94111, (415) 983-0000

Data Processing Professionals

Seeking A Challenging Environment For Real Career Growth?

We are a major Fortune 500 producer of nationally-known proprietary drugs, toiletries, cosmetics, and household products. Our progressive Data Processing Department has a 1.5MB 370/155 installed using OS/MVT and IMS for our on-line 3270 TP network. If you have a college degree or equivalent experience and meet the specifications for either of the following positions, we would like to talk "career" with you!

SYSTEMS ANALYST

Marketing Or Advertising

We are looking for a person to be the primary interface between Data Processing and the Advertising and Marketing functions of our company. You will have the responsibility for designing, planning, implementing, and maintaining all Data Processing systems for these areas. You must have 3-5 years' experience in Data Processing, be able to communicate effectively with all levels of user management and have a working knowledge of these corporate functions. This is an excellent position for a person "on the way up" and will require the ability to supervise whatever people are necessary to accomplish the above functions.

Our headquarters and all DP support are located in Memphis - one of the fastest-growing and cleanest cities in the country . . . in the middle of great hunting and fishing and almost year 'round summer sports. Interview and relocated expenses are fully paid. Please send your resume, including salary history indicating position in which you are interested, in strict confidence to:

Plough, Inc.

St. Joseph's Aspirin, Digel,
Q.T., Coppertone & Mabeline

PROGRAMMER/ANALYST

Manufacturing Environment

You must have a minimum of 1 year of experience as a programmer or analyst and be proficient in the use of ANS COBOL. Our Manufacturing Team is developing a brand new on-line system to replace an existing one that is largely manual. We have written our own Bill of Material and currently have an on-line stock status and inventory commitment system among others. Future systems include requirements planning, capacity planning and production scheduling. This job will help you develop proficiency in a wide range of DP skills and will have heavy involvement with manufacturing management. Preference given to people with some experience in manufacturing projects.

Professional Placement
Administrator
Personnel Department
P.O. Box 377, Memphis, Tenn. 38151
An Equal Opportunity Employer M/F

INSTRUCTORS

Computer Hardware Computer Software

We are seeking dynamic instructors to teach computer hardware and software to our customers and our own in-house personnel. A thorough knowledge of hardware and/or software and a real desire to teach is required.

We are currently expanding at an unprecedented rate. We employ the latest teaching techniques, the most up-to-date laboratories and modern facilities in the computer industry.

If you have a sound technical background and teaching experience or the desire to teach, please contact us to find out about our unlimited growth possibilities.

Please send you resume to Ken Trend, Digital Equipment Corporation, 162 Main Street, Maynard, Mass. 01754.

digital
digital equipment corporation

The above positions are open for application to men and women regardless of race, national origin, age, religion or creed.

Systems Analysts and Programmers

"Grow with Rubbermaid"

Are you interested in the challenge of rapid growth with a leading consumer products manufacturer whose annual sales exceed \$100 million? Right now, we are seeking individuals with 1-4 years' experience in a multi-programming, disc-operating environment for the following positions:

SYSTEMS ANALYST

You will execute the technical and advisory functions needed to design and install financial, marketing and manufacturing application systems. You are results-oriented and able to carry out assignments from conception to completion.

PROGRAMMER

Working with Systems Analyst your duties will involve programming, detail design, coding, testing, debugging and documentation. You should possess a high degree of proficiency in the use of COBOL.

Working with our Honeywell 6040 Computer, you'll be involved in data base design and programming utilizing I.D.S. Previous exposure to Honeywell 355 Teleprocessing will be an asset.

Candidate selected for these positions will have exceptional career growth opportunities in information processing for other management disciplines and will participate in our outstanding benefit program, including profit sharing.

Please send your resume and salary history in complete confidence to:

Rubbermaid

Paul Slack
Corporate Personnel
RUBBERMAID INC.
Wooster, Ohio 44691

An Equal Opportunity Employer M/F

POSITION ANNOUNCEMENTS	POSITION ANNOUNCEMENTS	POSITION ANNOUNCEMENTS	POSITION ANNOUNCEMENTS	POSITION ANNOUNCEMENTS
------------------------	------------------------	------------------------	------------------------	------------------------

COMPUTER PERFORMANCE EVALUATION ANALYSTS

— \$9,969 to \$26,671 PER ANNUM —

Numerous immediate openings for intermediate through senior computer specialists and operations researchers with strong backgrounds in measurement, simulation, or analysis of computer systems. Civil service grade range GS-7 through GS-14 commensurate with experience.

Submit resume with salary history or SF 171 to:

DEPARTMENT OF THE AIR FORCE
FEDSIM/CV

WASHINGTON, DC 20330 PHONE: (202) 274-8461

THE FEDERAL COMPUTER PERFORMANCE EVALUATION AND SIMULATION CENTER (FEDSIM)
AN EQUAL OPPORTUNITY EMPLOYER

PROGRAMMER ANALYSTS

Large Scale Systems
Large Scale Challenges
Large Scale Opportunities

The size and scope of our computer systems demands the aggressiveness of programmer professionals who think big... about their future... their talents... and their capabilities. You'll be working in a project team environment in one of industry's largest and most progressive computer centers where you can measure your progress in terms of accomplishments and advancement. Immediate opportunities are available in the following areas for experienced programmer analysts:

PRODUCTION COMPUTER SYSTEMS

The shift in processing technique from a tape to a disc environment using a variety of file access and structure techniques including data base design and management creates a "right now" challenge. To achieve our goal of a totally integrated real time Production/Material Management System, we need persons familiar with a variety of high level languages — ANSI COBOL, FORTRAN IV, and PLI.

ENGINEERING COMPUTER SYSTEMS

In addition to the main-frame computer system and a variety of time-sharing terminals, this department uses interactive graphics terminals, intelligent and remote batch terminals and a variety of automatic plotting systems. Primary language is FORTRAN IV. COBOL, special data base management software and assembly languages also utilized. Projects cover a variety of areas including structural analysis, fluid mechanics, electrical, heat transfer, etc.

FINANCIAL & ADMINISTRATIVE COMPUTER SYSTEMS

Involvement encompasses systems supporting Payroll, Personnel, General Accounting, Tax, Benefit Accounting, Medical Monitoring, and Scheduling and Manhour cost accounting functions. All systems are written in ANSI-COBOL and utilize latest disc retrieval methods.

Relocation required. Salaries are competitive. Potentials unlimited. Qualified candidates, please send resume to:

CW Box 4062
797 Washington St.
Newton, Mass. 02160

An Equal Opportunity Employer

SCIENTIFIC SYSTEMS ANALYST

Our newly created position offers professional challenge with a respected pharmaceutical company and the opportunity for small city or country living within minutes of our Research Center. This is more than just a job. It's the opportunity for a better life style.

We seek an Analyst with scientific systems experience. Initial assignment will be the development and implementation of medical systems. Eventually we envision broad scientific systems exposure. Demonstrated ability is the most important requirement and while not mandatory, an appreciation of statistics and FDA submissions is desirable.

We offer a competitive employment package including a salary commensurate with experience and relocation assistance.

Interested individuals should send resume stating salary requirements, in confidence, to S.P. Spence, Sr., Employment Representative.

Norwich Pharmacal Co. &
Eaton Laboratories

Division of Morton-Norwich Products, Inc.
Norwich, New York 13815

An equal opportunity employer, M/F

YOUR RESUME

Write it yourself!

INSTRUCTIONS

SAMPLES

FORMS: \$4

Resume Company

Dept. DP

359 Jersey Ave.

Fairview, N.J. 07022

Systems Analyst

MANUFACTURING SYSTEMS ANALYST

Duties to include analysis, design and programming of manufacturing systems utilizing Bills of Material Processing.

Position requires a degree in Business, Computer Science or related field plus three years of related experience. Candidates must be familiar with IBM 370, DuS/V5 and COBOL.



3333 Hillview Avenue
Palo Alto, Calif. 94304
U.S. citizenship required
Equal opportunity employer m/f

PROGRAMMER ANALYST

SYSTEMS PROGRAMMER
Recent conversion to 370/145 has created numerous openings for experienced Programmer Analysts and Systems Programmers.

Applicants should have prior experience with Cobol, DOS, DOS/VS or OS. Assembler and/or T.P. exposure a plus.

Send resume and salary requirements to:

BLUE CROSS
AND BLUE SHIELD
2 Pillsbury Street
Concord, N.H. 03301

SOFTWARE ANALYST

Pacific Northwest

Pacific National Bank of Washington in Seattle, Wa, offers to the on-line teleprocessing software and operating systems expert an opportunity for upward mobility to supervision, advanced technical challenge, and exposure to top management. Our S-370 teleprocessing system for our statewide banking system is one of the most sophisticated in the country. Requirements: systems programming, teleprocessing experience, OS VS1, degree or certification preferred. Submit your resume and salary requirements to Don Rhodus, Assistant Vice President and Sr. Staffing Officer, P.O. Box 160, Seattle, Washington 98111, or call (206) 292-3565

Pacific National Bank of Washington
an equal opportunity employer

DYNAMICS RESEARCH CORPORATION

60 Concord Street

Wilmington, Massachusetts 01887

DRC is an Equal Opportunity Employer

SYSTEMS ANALYST

An opportunity for a college graduate with 2 - 5 years experience as a Systems Analyst or non-graduate with 6 - 10 years experience in Data Processing. Must have experience in COBOL and DISK in a manufacturing environment. Experience working under an Operating System is desirable. Good human relations skills and supervisory potential are required.

Location would be at Corporate Headquarters in Marinette, Wisconsin. Responsibilities will include:

- o Work with users in designing new systems or modifications to existing systems
- o Establish schedules and benchmarks for systems under development
- o Implement and document systems
- o Direct efforts of programmers

Company sales have grown 39 per cent in the last two years and exceeded \$80 million in 1973. Subsidiaries in six foreign countries. Company products include a wide range of fire protection equipment as well as agricultural and industrial chemicals.

Send resume and salary requirements to: Christian Klages



THE ANSUL COMPANY, MARINETTE, WISCONSIN 54143

AN EQUAL OPPORTUNITY EMPLOYER — M/F

computer professionals

when is the best time to advance your computer career?

Right now! The demand for your specialized services is at an all-time high. So employers are entirely responsive to your career objectives... income... position... challenge.

And ESP Associates has the broadest contacts going for you... in your own city... or in any other city, if you want to relocate.

Contact our office nearest to you, and place your career in the hands of the professionals.

esp associates

CLEVELAND
McCormick & Associates, Inc.
601 Rockwell Avenue
Cleveland, Ohio 44114

DALLAS
Data Processing Careers
Suite 1109
Stemmons Tower West
Dallas, Texas 75207

DETROIT
Electronic Systems Personnel
1705 Fisher Building
Detroit, Michigan 48202

HARTFORD
Compass, Inc.
900 Asylum Avenue
Hartford, Connecticut 06105

KANSAS CITY
Electronic Systems Personnel
370 TenMain Center
Kansas City, Missouri 64105

LOS ANGELES
Career Data Personnel Agency
Suite 323
3303 Wilshire Boulevard
Los Angeles, California 90010

MILWAUKEE
EDP Consultants
11430 W. Bluemound Road
Wauwatosa, Wisconsin 53226

MINNEAPOLIS/ST. PAUL
Electronic Systems Personnel
801 Nicollet Mall, Suite 1716
Minneapolis, Minnesota 55402

PITTSBURGH
Electronic Systems Personnel
106 Lawyers Building
428 Forbes Avenue
Pittsburgh, Penna. 15219

SAN FRANCISCO
The Computer Resources Group
303 Sacramento Street
San Francisco, Cal. 94111

ST. LOUIS
Christopher & Long
7777 Bonhomme, Suite 1801
St. Louis, Missouri 63105

WASHINGTON, D. C.
ESP Systems Corporation
Suite 704
1211 Connecticut Ave. N.W.
Washington, D. C. 20036

BUY SELL SWAP	BUY SELL SWAP	BUY SELL SWAP	BUY SELL SWAP	BUY SELL SWAP
<p>don't lease!</p> <p>UNTIL YOU FIND OUT WHY LEASING FROM THE FULL-SERVICE COMPANY IS DIFFERENT.</p> <p>NOW AVAILABLE</p> <p>360 20/50 I plus I/O set</p> <p>360-20/40 H plus I/O set</p> <p>CALL STEVE ELIAS AT (213) 678-0311 OR WRITE TO:</p> <p>CSC COMPUTER SCIENCES CORPORATION 650 N. SEPULVEDA BOULEVARD LOS ANGELES, CALIFORNIA 90045 Major Offices and Facilities Throughout the World</p>	<p>AVAILABLE</p> <p>25 NCR 955 DISK PACKS</p> <p>Presently under lease expiring February 1977. Lease can be taken over by interested party.</p> <p>Call or Write:</p> <p>Larry S. Partridge N.H. BALL BEARINGS, INC. Peterborough, N.H. 03458 (603) 924-3311</p>	<p>BUY • SELL RECONDITION</p> <p>New or Used TELETYPE MACHINES & DATA COM EQUIPMENT</p> <p>call or write: (214) 252-7502 TWX 910-860-5761</p> <p> vardon & associates, inc. 930 N. Beltline, Suite 140 Irving, Texas 75061</p>	<p>MOORE BURSTER MODEL 426 B WITH TRIMMERS</p> <p><i>Phads Data Supply Corp.</i> 1511 Marine Parkway Brooklyn, N.Y. 11234 (212) 253-4967</p>	<p>370-145 FOR SALE</p> <p>3145 C.P.U. (262K) 7844, 6982</p> <p>3210-Console D.P.A. Inc. 2636 Farrington Dallas, Texas 75207 (214) 637-0950</p>
<p>SALE: 370/155 J 1433, 7855, 3215</p> <p>AVAIL. MAY 1974</p> <p>360's * 370's</p> <p> BUY • SELL COMPUTER SALES INC. 21 INFIELD LANE MATAWAN, N.J. 07747 (201) 566-0060</p>	<p>BUY • SELL • RECONDITION TELETYPE®</p> <p>Machines — New, Used</p> <ul style="list-style-type: none"> • Models 28, 32, 33, 35, 38 • BRPE's • CRT's • Couplers • Enclosures • Modems • 10, 15, 30 CPS Terminals <p>NAT'L TELETYPEWRITER CORP. 23 Cain Dr., Plainview, N.Y. 11803 (516) 293-0444</p>	<p>WANTED</p> <p>Univac 1052 &/or 1053 Memory Xerox Sigma Peripherals (All Types) Data Products Card Readers & Punches Univac/ETTR Line Printers K/ASR 35 Teletypes</p> <p>TOP DOLLAR PAID</p> <p>Quelex Data Systems, Inc. 8740 Shirley Ave. Northridge, CA 91324 Telephone No. (213) 349-9711 TWX No. (910) 493-1245 Contact: "Dyanmic Duo" C. Fusco/L. Levinson</p>	<p>FOR SALE UNIVAC</p> <p>1004-11 1005-111 Tape Uniservo 6C tape subsystem Master & Slave</p> <p>WE WANT TO BUY UNIVAC 1004/1005</p> <p>Contact M.A. Jarrett</p> <p>MAINTech INC. 1133 Ave. of the Americas New York, N.Y. 10036 (212) 586-2823</p>	<p>WE PURCHASE 360/20/30 WE LEASE & SELL 360/20/30 THIS WEEK 360/20 SPECIALS: Bi-Synch</p> <p>For Sale 029, 059, 083, 084, 026, 557 All 360/20 Systems</p> <p>SIMPLICITY COMPUTER CORP. 1600 Broadway New York, New York 10020 (212) 541-6340</p>
<p>360-40 196K</p> <p>FOR SALE BY OWNER AVAILABLE IMMEDIATELY</p> <p>CALL OR WRITE: DON GERMANY FIRST DATA MANAGEMENT CORPORATION P.O. BOX 25189 OKLAHOMA CITY, OKLA. 73125 (405) 272-4062</p>	<p>HELP!!</p> <p>360/50 I 3 channels</p> <p>Available for Short Term Rent or Long Term Call Tom Cutter (216) 687-0100</p>	<p>30-40% off Kybe Tape cleaners</p> <p>used TC-10's used E-24's</p> <p> Sales Plus P. O. Box 13 Weymouth Landing, Mass. 02188</p>	<p>FOR SALE OR LEASE IBM 1401 SYSTEMS</p> <p>with or without Tape Drives & Disks Savings in thousands Member Computer Dealers Assoc.</p> <p>D.P. Equipment Marketing Corp. 260 W. Broadway, N.Y. N.Y. CALL (212) 925-7737 Ext. 1</p>	
<p>FOR OUTRIGHT SALE COMPUTER PROGRAM GUARANTEED FULLY TESTED</p> <p><i>"Comprehensive File Maintenance System"</i></p> <p>UNIQUE LNT DATE TIME REGISTRATION FULFILLMENT MAIL ORDER FULFILLMENT ... and more... ALL TYPE DATA SYSTEMS, INC. 190 East Hoffman Ave. Lindenhurst, N.Y. 11757 Tel: (212) 686-3700</p>	<p>IBM 360/25 SYSTEM FOR SUBLEASE</p> <p>24K Core 1052 1403-7 2540-1 2311 (4) Disk Packs (20)</p> <p>\$3,500/Mon. (Excl. Maint.) Dec. '74 to Sept. '77</p> <p>Contact C.F. Busky COPPUS ENGR. CORP. 344 Park Ave. Worcester, Ma. 01610 (617) 756-8391</p>	<p>For Sale</p> <p>2 B421 Magnetic Tape Units, 556 density \$2000 each University of Rochester (NY) (716) 275-4871</p>	<p>Available: 1412 with 360 adaptor 1412 with 1401 adaptor Avail. 60 days</p> <p>FOR BETTER VALUE LOOK TO:</p> <p>cac COMPUTER ACQUISITIONS COMPANY P.O. Box 80572 Atlanta, Ga. 30341 (404) 458-4425 Strathmore Office Bldg. Highway 34 Matawan, N.J. 07747 (201) 566-8924</p>	
<p>FOR SALE UNIVAC 9300</p> <p>32K CPU with Multiplexor Channel Three 9 track tape drives, 800 bpi 132 position printer, 600 lpm Card Reader, 600 cpm Card Punch, 75/200 cpm</p> <p>P.O. Box 1599 Boise, Idaho 83701 (208) 345-7770 ATTN: Mike Welch</p>	<p>FOR SALE</p> <p>1131-2C w/1442, 1403, 1133, 2310, 1627, etc. Also (2) 1132-1 Printers. (2) 2401 & 2803 • 1440-12K Sys. 360-30/65K CPU • 7770-10K Sys. 1051 & 1052 • 3210-2 2911-2 Switch • 2841-1 824 w/2 type • 1232-1 w/534 2315 D.Pacs • 548 • 066 • 514 w/MS (53) 1907 & 1935 tape cassette and keybd/Card Rdr w/2740 & 2701</p> <p>WANTED</p> <p>Calcomp Plotters • Univac 1108 Core Burroughs Core Honeywell H-200-8K Buy and Sell all makes computer gear and Unit Record.</p> <p>ADAM COMPUTER 105 Hinricher Willow Springs, Ill. (312) 839-5164</p>	<p>360/20</p> <p>8K Card System Under \$960/Month Including IBM Maintenance 8, 12, 16K Systems Available Wide Range of Features & I/O Including Bi-Synch</p> <p>CMI Corporation 16225 E. Warren Ave. Detroit, Michigan 48224 (313) 889-0440</p> <p>CMI Company 408 Bartlett Building 76 University Ave. W. Windsor, Ontario N9A 5N7 (519) 258-8910 Member Computer Dealers Association</p>	<p>WANTED ALL 360 SYSTEMS</p> <p></p> <p>CG CORPORATE COMPUTERS, INC. 115 Mason St., Greenwich, Conn. 06830 (203) 661-1600 Member Computer Dealers Association</p>	
<p>BURROUGHS EQUIPMENT (Less than 24 months installed)</p> <p>E8000 SYSTEM \$25,000 (Will consider offer)</p> <ol style="list-style-type: none"> 1) E8491 — CPU with ledger/paper console 2) A594 — CARD READER 3) A988 — PRINTER 4) A149 — KEYPUNCH AT-TACHED (on/off line) 5) A131 — SORTER (80 COL) <p>L2000 SYSTEM \$5,000 (Firm price)</p> <ol style="list-style-type: none"> 1) L2000 — BASIC UNIT with extended memory 2) A595 — CARD READER 3) A149 — KEYPUNCH (on/off line output) <p>TC500 SYSTEM \$5,000 (Firm price)</p> <ol style="list-style-type: none"> 1) TC500 — BASIC UNIT (with-out communicating opt) 2) A149 — KEYPUNCH (on/off line output) <p>KENNETH SMITH AND ASSOCIATES, INC. 1122 Parkway Towers Nashville, Tennessee 37219 (615) 255-4159</p>	<p>WE BUY • SELL • RECONDITION TELETYPE®</p> <p>Machines & Parts Expert Modem & Coupler Repair</p> <p>Call or Write:</p> <p>A.D.M. Communications 1265 Simpson Way Escondido, Calif. 92025 (714) 747-0374</p>	<p>BUY SELL LEASE</p> <p>All model 360/20's, 360/30's, 40's, 50's, and 65's. 370's and System 3's. All peripherals and unit record equipment.</p> <p>IBM 1401 SYSTEMS</p> <p></p> <p>DATA AUTOMATION CO., INC. 4858 CASH ROAD DALLAS, TEXAS 75247 (214) 637-6570 Member Computer Dealers Assoc</p>	<p>FOR SALE OR LEASE REASONABLY PRICED UNIVAC 1108/65K CORE</p> <p>AVAILABLE WITH OR WITHOUT PERIPHERALS, INCLUDING VIII C TAPE DRIVES, 432 DRUMS, PRINTER, AND NECESSARY CONTROLLERS.</p> <p>CW Box 3997 797 Washington Street Newton, Mass. 02160</p>	

BUY SELL SWAP

FOR LEASE
IBM 2401
Mod 5 (Qty. 4)
\$305 per month each
I.O.A. DATA CORP
383 Lafayette St., NY 10003
(212) 673-9300

BUY SELL SWAP

1401
8K and 16K
With 7330 Tape Drives
Available 30 days
CMI Corporation
16225 E. Warren Ave.
Detroit, Michigan 48224
(313) 889-0440
CMI Company
408 Bartlett Building
76 University Ave. W.
Windsor, Ontario N9A 5N7
(519) 258-8910
Member Computer Dealers Association

BUY SELL SWAP

268 USED
IBM MT/ST TAPES
FOR SALE
Demagnetized Clean Labels
Good Condition
Best Offer Above \$5 Each
Contact: Mrs. England
ANDERSEN PRODUCTS
Oyster Bay, New York
Telephone: (516) 922-5100
Telex: 96-7722 ANPRO USA OYST
Cable: ANPRO
OYSTERBAYNEWYORKSTATE

BUY SELL SWAP

buy·lease·sell
370 & 360 EQUIPMENT

MEMBER:
COMPUTER DEALERS
ASSOCIATION

CIS
CONTINENTAL INFORMATION
SYSTEM CORPORATION

CIS PRESENTS ECONOMY
IN IBM HARDWARE, and
backs it up with an estab-
lished reputation for service,
dependability and a penchant
for detail. No loose ends. Per-
sonal contact with experience
gathered in the field combine
to bring you maximum econ-
omy and razor sharp perform-
ance. Talk to a CIS man now.
You know he'll deliver!

Contact:
B.J. Mahoney
D.R. Tebo
J.L. Delaney

MIDTOWN PLAZA, SYRACUSE, NEW YORK 13210 (315) 474-5776

BUY SELL SWAP

HONEYWELL
MEMORY SALE

8K	16K	32K
\$5,750	\$9,750	\$17,750

CPU's
H 1201 4(65K) H 201 2 8(32K)
Tape System
(4) 13Ks & Controller - \$12,750
Complete Systems Available
Ex. H-115 (32K)
2 Disks, 3 Tapes, Ptr. CR & CP - \$67,500
Leases Available
All equipment sold is eligible for Mfg. Maintenance

OAC

[415] 332-6262
110 H Vista Road, Sausalito, Calif. 94965

FOR SALE
NCR 500 with punch paper tape and cards. This is a complete savings and loan system and programs. Equipment is 7 years old and has been under continuous NCR maintenance. We are converting to a new NCR Century and would like to dispose of other system about July 1, 1974

Contact: Marvin Womack
San Angelo Savings Association
Box 1828
San Angelo, Texas 76901
phone (915) 655-4111

Before You Buy - Lease Sell - 360, 370, 1401 IBM Unit Record Equip. Please Call or Write
COMPUTER CLEARING CORPORATION
5025 N. Central Expressway
Suite 3046 Dallas, Texas 75205
Telephone (214) 528-5087
18 Years Experience, and -
"We guarantee delivery at a fair market price."
George Jachimiec, President

CONTROL DATA
CDC 3300 MASTER SYSTEM
Ideal for Educational Institutions - Hospitals - Scientific environments - with Business Data Processing.

CDC Peripherals
Additional Memory

Short term lease or sale on extremely Attractive Terms.
Guaranteed Trade In or Upgrade to IBM 370 System.

Computer Systems
of America, Inc.

141 Milk Street, Boston, Mass. 02109
(617) 482-4671

buy
lease

360/370

sell
trade

CPU's <ul style="list-style-type: none">• 360/20• 16K Disk• 360/25• 24K• 360/30• 32, 64, or 96K• 360/40• 64, 128 or 256K	DISK <ul style="list-style-type: none">• 2314-9 Drive• 2314-4 Drive• Dual Density• Compatibles• IBM 2311s• Memorex 630s• MAI - 2301s• 1311s Md 1, 2, 5	TAPE <ul style="list-style-type: none">• 2415-4• 1600 BPI• 2804-2 Ctlr• 2803-1 Ctlr• 2401-2• 2402-2
PRINTERS <ul style="list-style-type: none">• 1403-2 N1		

Call Collect (612) 546-4422

dataserv
equipment inc.
400 shelard plaza o suite 415
minneapolis, mn 55426
Member, Computer Dealers Assoc

SYSTEMS
INCORPORATED
DATA
PROCESSING
EQUIPMENT
SPECIALISTS

2200 E. Devon Avenue
Des Plaines, Ill. 60018
(312) 827-8135

360/370

SYSTEMS
INCORPORATED
DATA
PROCESSING
EQUIPMENT
SPECIALISTS

Who took all the gamble out of buying & selling used computers?


Comdisco. Biggest dealer in the world.
The one who has already bought & sold more used 360's & 370's than anybody else.

We're the one who thinks nothing is too small or too big to handle - be it a tape or disc drive, or a complete 370 system. The one who offers the same professional expertise to all DP users, big and small. The one who handles it all from start to finish, including transportation, installation, etc., for you and your foreign subsidiaries. The one who warns you not to buy good intentions, but real hardware that's available now and maintainable by IBM when you get it. The one who tells you where the equipment is, who owned it, what its serial number is and when you can inspect it. The financially stable one who's here today and here to-

morrow. **Our idea:** Give every transaction and customer, big and small, the same expeditious treatment. **The result:** It paid off for users and for us. Hundreds of firms have saved millions and we're now No. 1 in buying, selling, leasing, trading used IBM equipment. Thus we're able to draw on the experience of many users and their cost-saving methods. Like using used 360's to do the same job as new 370's. Often the biggest difference is price! Write for more information, cost-saving data and our annual report. **For instant action call us collect anytime. Our phone: 312-297-3640. Our TWX number: 910-233-2478.**

Available from Comdisco:
SALE, LEASE, TRADE - 370's: 370/155 available immediately, 370/135 available April.
SALE, LEASE, TRADE - 360's: Special on 360/40 CPU's - lease or sale all models in inventory from 64K to 384K. Special on all IBM 40 core, all increments to 364K. 360/50 available now, 360/30 96K all IBM core, 360/65 sale or lease.
SALE, LEASE - OTHER, 2314 model 1 or A1, 3 to 9 spindles, 2365-2 core, 3360-3, 2420-7 tape drives, I/O sets available.
WANTED TO PURCHASE OR TRADE: 370/145 - 256K model 1.

COMDISCO
2200 E. Devon, Des Plaines, Illinois 60018

Member Computer Dealers Assoc

BUY SELL SWAP	BUY SELL SWAP	BUY SELL SWAP	BUY SELL SWAP	BUY SELL SWAP
<p>BUY...SELL...LEASE IBM 360/370</p> <p>THE COMPUTER EXCHANGE INC. Member, Computer Dealers Association</p> <p>In the West: 235 Montgomery Street, San Francisco, CA 94104, (415) 788-0600. In the East: 11 Grace Ave., Great Neck, N.Y. 11021, (516) 466-6500.</p>	<p>IMMEDIATE DELIVERY IBM-Compatible Disk Systems</p> <p>2314-TYPE</p> <p>Controller & Four Spindles Rental: \$985/month Purchase: \$28,000 Larger configurations available Sorbus Maintenance</p> <p>tbi TBI Equipment Div. Time Brokers, Inc. 500 Executive Blvd. Elmsford, N.Y. 10523 (914) 592-4065</p> <p>Nationwide broker/dealers of OP equipment & computer time Boston Chicago Elmsford N.Y. Los Angeles New York City Washington D.C. and San Francisco Member Computer Dealers Association</p>	<p>155 MEMORY FOR SALE OR LEASE 1.5 Meg. Cambridge Memory Immediately Available For Purchase or Sublease.</p> <p>Call or Write: United Banks Service Company 5700 South Ulster Parkway Englewood, Colorado 80110 (303) 770-2400 Attn: Lyle Hurdell or Roger Johnson</p>	<p>FOR SALE 360/30 E 32K 1.5 USEC #3237 #6960 #7915 1051-N1, 1052-8 2821-1, 2540-1, 1403-2 \$110,000 Avail Immed on IBM M/A</p> <p>I.O.A. DATA CORP 383 Lafayette St, NYC 10003 (212) 673-9300 MEMBER, COMPUTER DEALERS ASSOC.</p>	
<p>New! 1401 SIMULATOR "SIM 14"™ NOW AVAILABLE FOR 360-50-65 USERS</p> <ul style="list-style-type: none"> • EXECUTES UNDER BOTH DDS & OS • SUPPORTS 1401 UNIT RECORD, TAPE AND DISC DEVICES • JCL AND FILE COMPATIBLE WITH CS30-40 • SELF RELOCATING FOR MULTIPLE PARTITION EXECUTION • THROUGHPUT SPEEDS EQUAL TO CS40 • PROVEN PRODUCT BY CUSTOMER USE • TAKE ADVANTAGE OF 360-50-65 LEASE PRICES WITHOUT HAVING TO REPROGRAM ANY 1401 PROGRAMS <p>Call or Write DEARBORN COMPUTER LEASING CORPORATION Subsidiary of Dearborn-Storm Corporation 4849 No. SCOTT, SCHILLER PARK, ILLINOIS 60176 312 671-4410</p>	<p>ANNOUNCING A NEW AND UNIQUE PUBLICATION MIXON'S DATA PROCESSING STANDARDS</p> <p>...the system the industry has waited for! Over six years in the making and ready for use!</p> <ul style="list-style-type: none"> • PROVIDES COMPREHENSIVE TRAINING PROGRAM • IMPROVES DEVELOPMENT EFFICIENCY BY 15-30 PERCENT • REDUCES MAINTENANCE THROUGH STANDARD DEVELOPMENT PHILOSOPHY • FACILITATES MANAGEMENT CONTROL • SPECIFIC GUIDELINES FOR MODULAR PROGRAMMING, DATA ELEMENT DICTIONARY, ETC. <p>For more information, contact: Consulting Services Incorporated 2971 Flowers Road South Suite 174 Atlanta, Georgia 30341 Phone: (404) 451-6391</p>	<p>FOR SALE Data Products Printers (most interfaces available) Ampex TM 7, 9, 16, Tape Transports Potter SC 1080 Tape Transports Hewlett Packard/Datamec 3030 Tape Transports I.M.S. Disc Drives Memorex Disc Drives (2314 Comp.) Talley Paper Tape Readers/Punches Wango Tape Transports NCR Line Printers Xerox Systems and Peripherals All above equipment completely refurbished and warranted.</p> <p>Quelex Data Systems, Inc. 8740 Shirley Ave. Northridge, CA 91324 Telephone No. (213) 349-9711 TWX No. (910) 493-1245</p> <p>THE 1ST SECOND SOURCE IN DIGITAL EQUIPMENT Contact: "Dynamic Duo" C. Fusco/L. Levinson</p>	<p>we buy and sell</p> <p>IBM Unit Record Machines IBM 735 I/O Terminals NCR 31 - 32 - 33 - 395 - 400, NCR 480 - 481 - 482 - 450 BURROUGHS - L - SERIES</p> <p>84 Kennedy St. Hackensack, N.J. 07601 (201) 343-4554</p>	
<p>BUY-SELL-LEASE 360/20</p> <p>360 30/40/50 65 370 145/155 1130</p> <p>ECONOCOM Subsidiary of Cook Industries Inc. 855 Ridge Lake Blvd. P.O. Box 171116 Memphis, Tennessee 38117 (901) 767-9130 "MEMBER COMPUTER DEALERS ASSOCIATION"</p>	<p>360/370 BUY-SELL-LEASE</p> <p>Call or Write: George S. McLaughlin Associates, Inc. 480 Morris Avenue Summit, N.J. 07901 (201) 273-5700 Member Computer Dealers Association</p>	<p>360-370 marketplace BUY • SELL • LEASE</p> <p>TLW COMPUTER INDUSTRIES INCORPORATED</p> <p>BRANCH OFFICE: 222 E. Wisconsin Ave. Lake Forest, Ill. 60045 (312) 295-2030</p> <p>BRANCH OFFICE: 3031 Tisch Way Executive Suite 13 San Jose, Calif. 95128 (408) 249-0110</p> <p>3570 AMERICAN DRIVE • ATLANTA, GEORGIA 30341 • 404/451-1895</p>		
<p>You can't beat our deal on a used IBM 370.</p> <p>Who else has the inventory to provide the exact configuration you want — when you want it? Who else will quote you a serial number along with a price? And who else pays top-dollar for your 370?</p> <p>With over half a billion dollars in IBM computer experience, we know the data processing market like nobody else's business. So call the Computer Sales Corporation at ITEL.</p> <p>Rick Becker at (415) 983-0260, Fred Hegeman at (415) 983-0410, or Dick Hynes at (415) 983-0278.</p> <p>ITEL CORPORATION One Embarcadero Center San Francisco, Calif. 94111</p> <p>145, 155, 3360's, 360-50 and 2314's available... 135's, 145's, 155's and 165's required.</p>	<p>FOR SALE OR LEASE IBM 1410 COMPLETE TAPE AND DISK SYSTEM BARGAIN PRICED Member Computer Dealers Assoc.</p> <p>D.P. Equipment Marketing Corp. 260 W. Broadway, N.Y. N.Y. CALL (212) 925-7737 Ext. 1</p>	<p>360 370</p> <p>2030F 2040G 2040G or H 1 Chan, Both 2 Chan, Both SN 22072 Ariths, 1052 Ariths, 1052 2 Chan, Both Ready Plus More Ariths, 1052 To Ship Available July Plus More All Models Tapes, Disks, Readers, Punches, Printers Available With Above CPU's 1401 16K SN 25B11 Loaded System/5 Tapes Avail. Now Under \$25,000 Member Computer Dealers Assoc.</p> <p>LUNCEFORD & ASSOCIATES Valley View Bank Bldg. (913) 381-7272 Overland Park, Kan. 66212</p>		
	<p>MOVING?</p> <p>Please notify Computerworld at least four weeks in advance. When writing about your subscription, please enclose a recent mailing label. The code line on top may not mean much to you, but it is the only way we have of quickly identifying your records. If you are receiving duplicate copies, please send both labels.</p> <p>797 Washington Street Newton, Massachusetts 02160</p>	<p>Rotating memories due for overhaul? Come to Burton for it all... in a hurry!</p> <p>Save down-time and money by letting the experts, with all the right capabilities and equipment, do the job effectively and efficiently — on time, every time! Complete service includes the ability to overhaul:</p> <ul style="list-style-type: none"> • Disc/Drum recording surfaces • Rebuilding recording heads • Motors; Bearings; Harness Assemblies • Assembly and close tolerance inspection/testing/certification • 1-year warranty <p>Call us for a quick quote on all your fast turn-around memory overhaul requirements. (213) 391-0535</p> <p>BURTON MAGNEKOTE 11334 Playa Street, Culver City, CA 90230</p>		

BUY SELL SWAP	BUY SELL SWAP	BUY SELL SWAP	BUY SELL SWAP	BUY SELL SWAP
Lease Buy Sell DEAL WITH PROFESSIONALS IN PLACEMENT OF PRE-OWNED EQUIPMENT 360/370 "The Nations Largest Wholesale Dealer" COMPUTER WHOLESALE CORP. Suite 441-447 National Bank of Commerce New Orleans, La. 70112 (504) 581-7741	CALCOMP PLOTTERS <i>Available for Sale</i> 780/763 System 750/565 or 563 Systems 565/563 Plotters Each item with warranty. Sale or lease terms. WANTED: Calcomp Tape Drives & Plotters AVS Automated Visual Systems (213) 598-3318 (303) 426-0545 <i>"The largest firm in the industry specializing in plotter resales and plotter supplies."</i>	Current Inventory SALE All this Unit Record Equipment in stock and ready to ship at money saving sale or lease prices. RARELY OFFERED 046, 047, 029, 059, 407, A3, 548, 557, 087, 088 MARK SENSE 519 OTHER FINE MODELS 024 026 056 077 085 402 403 407 514 519 523 552 602 604 521 826 <i>Member Computer Dealers Assoc.</i> D.P. Equipment Marketing Corp. 280 W. Broadway, N.Y. N.Y. (212) 925-7737 Ext. 1	Shop the CLC computer supermarket SALE... LEASE... PURCHASE... TRADE THIS WEEK'S SPECIAL: IBM 360/50s <i>(128K TO 1048K)</i> Complete systems with all peripherals. Hardware/software enhancements available. Call your nearest CLC office: Washington (703) 521-2900 Pittsburgh (412) 921-3077 Atlanta (404) 393-1309 Chicago (312) 298-0888 St. Louis (314) 878-4741 Kansas City (816) 471-7376 Houston (713) 447-0325 Los Angeles (714) 645-3712 San Francisco (415) 928-7202 Portland (503) 297-4721 CLC Computer Leasing Hq. 2001 Jefferson Davis Highway, Arlington, Va. 22202 Member: Computer Lessors Association	
SALE/LEASE 360/20's D2-16K, 1442-5, 2501 A-1 1403-2, D2-16K, 2203 A1, 2560 A1, (2) 2311-11, 2415-1 SPECIAL SALE 360/30's, 40's, 50's, with I/O sets, 3360-3 core units, 370-145's, 155's, 1401 1402-1, 1403-2 WE WANT TO BUY All model 360/20's, 360/30's 40's, 50's, and 65's. 370's and System 3's. All peripherals and unit record equipment. 360/370 & SYSTEM 3 FINANCING AVAILABLE (516) 487-9812 505 Northern Blvd. Great Neck, N.Y. 11021 CROSS COMPUTER CORPORATION	IBM 2324-1 with 2 channel switch for Sale or Lease Available Immediately Thomas Computer Corp. Suite 3807A 600 North McClurg Court Chicago, Ill. 60611 (312) 944-1401	BUY SELL LEASE 370/145 370/155 729's 360/50 1620 360/40 System/3 32K IBM 370 Cores IBM Terminals 220 HARVEST AVE EBM STATEN IS., N.Y. 10310 (212) 273-3636		
SALE OR LEASE 360 Systems, 1401 Systems 2400 Tape Drives, 2311 Disk Drives 1620 Systems, 029, 206, 059 All Types Unit Record Equip. Incl. 082, 083, 402, 407, 514, 519, 557 SPECIAL SALE 360 (30) Sys. 1620 Disk Sys. 1401-8K I/O Set 1443 Printer 729-Tapes 2311 Disk Drives • DPA with offices in most major cities now offers IBM equipment complete- ly reconditioned prior to shipment. • Member Computer Lessors Assn. • Call or Write DPA Inc. 2636 Farrington St., Dallas, Texas 75107 (214) 637-0950	EQUIP. WANTED 360 Systems, 1401 Systems Tape Drives All Types Of Card Equipment 029, 059, 026 dpa	WANTED TO BUY 360/30 65KB 2401 TAPE DRIVES FAST I/O SET <i>Principals Only</i> CW Box 4060 797 Washington St. Newton, Mass. 02160	Virtual 370-155 Available in May Model I-2 Model J-2 4 Year Lease \$18,827 \$21,367 5 Year Lease \$17,280 \$19,420 NO BROKERS PLEASE  Call: Larry Goichman Alanthus Corporation (914) 428-3703	
FOR SALE Loaded 360-40 256K Available - July 1 9-2402-II MAI 1-OCR-71 Immediate Delivery FIRST of FORT WORTH Dan Welborn (817) 336-9161	FOR SALE OR LEASE * IMMEDIATE DELIVERY * IBM 360/30 and 360/40 Complete Systems • 919 North Michigan Avenue • Chicago, Illinois 60611 • Telephone: (312) 943-3770 • Telex 255161 (CAPMARKCO • CGO) Member, Computer Dealers Association	370/145 WANTED Principal wishes to purchase 370/145. Please give speci- fications, availability, and prices, or write on company letterhead for further discus- sion. CW Box 4064 797 Washington St. Newton, Mass. 02160	For Lease 360/65 360/50 360/40 360/30 Honeywell 200 Charles Dieges Steve Zaleskie (212) 956-2858 (212) 956-4170 Talcott Computer Leasing Division of James Talcott, Inc. 1290 Avenue of the Americas New York, N.Y. 10019. Member-Computer Lessors Association	
SYSTEM 360/370 dearborn computer leasing corporation A business relationship you can't afford to be without... • Lease Terms to Fit Your Needs • Field Engineering Support • Systems Engineering Support • Well Trained Marketing Staff • Buy and Sell-360s • Subleasing • Member, Computer Lessors Association Dearborn Computer Leasing Corporation a subsidiary of Dearborn-Storm 4849 North Scott Street / Schiller Park, Illinois 60176 Area 312 / 671-4410	ACS ATTENTION!! 1440 USERS 7335-II TAPES 1403-2 PRINTER 1446-1 CONTROL AVAILABLE NOW 1401 SYSTEMS 360 SYSTEMS U/R EQUIPMENT <i>Member Computer Dealers Assoc.</i> ACS Equipment Corporation 8928 Spring Branch Drive Houston, Tx 77055 (713) 461-1333			

BUY SELL SWAP		BUY SELL SWAP		BUY SELL SWAP		BUY SELL SWAP		TIME FOR SALE	
<div>IBM UNIT RECORD EQUIPMENT AVAILABILITIES  Call us for all your needs, we buy, rent and sell all types of IBM unit record equipment. Over 12 years of serving commercial and government requirements. All equipment rebuilt at our own factory and guaranteed for IBM MAINTENANCE. Contact: John Fennell V.P. for proposal. 212-619-4747 Cable: Leasatron, New York Telex: 423857 LMC U1 116 East 27th Street New York, New York 10016 LMC Data, Inc.</div>		<div>WANTED BURROUGHS L SERIES TC 500, A149, A150 NCR 31, 32, 41, 42 481-482 FRIDEN Computypers and Flexowriters IBM 735 I/O Terminals Call Stuart Rubenstein I.O.A. Data Corp. 383 Lafayette St., N.Y. 10003 (212) 673-9300 Member Computer Dealers Assoc.</div>		<div>IBM 729 Magnetic Tape Units Models II, IV, V and VI IBM 1401 SYSTEMS Configured to your Requirements Card, Tape and Disk THE HALSEY CORPORATION 1367 Central Avenue Middletown, Ohio 45042 (513) 424-1697 Member, Computer Dealers Association</div>		<div>NEW YORK COMPUTER TIME 370/145 4-3330 6-3420 1-3211 1-1403 1-3505 1-2540 HANDS ON AND PARTITION TIME AVAILABLE JUST OVER BROOKLYN BRIDGE Management Data Services (212) 624-7400 Ext. 463 ASK FOR MR. BOUROS</div>			
<div>COMPUTER RESALE EXCHANGE, INC. is pleased to announce that MR. ALAN HALES has joined the company Mr. Hales was previously Founder and President of Computer Resale Brokers, Ltd., London, which at its zenith had offices in nearly a dozen countries in two continents, and was, in terms of volume, the largest buyer & seller of Used Computers in the world. Mr. Hales brings a wealth of experience to our company and will be especially helpful in expanding our international operations. He will spend part of his time at our new branch office in North Carolina, and the balance in Europe, Africa, Asia and South America. Inquiries are welcome concerning your domestic and/or overseas plans. Corporate Headquarters: (please note new address) 1737 DeSales Street, N.W. Washington, D.C. 20036 (202) 737-1401 Branch Office: 1303 Cypress Street Chapel Hill, N.C. 27514 (919) 929-5468 Member - Computer Dealers Association</div>		<div>370/135 FOR SALE OR LEASE (192K CPU) IPA, IFA, ICA 3210 Console Available Immediately Contact M.W. Ricciardelli (716) 297-8542 Frontier Computer Services, Inc. 8404 Pine Avenue Niagara Falls, N.Y. 14304</div>		<div>FOR SALE NCR Century DISC packs 655 = \$155.00 656 = \$105.00 657 = \$220.00 National Data Products, Inc. P.O. Box 9128 Fort Wayne, Ind. 46809 (219) 747-1502</div>		<div>I.B.M. - 360-30 All Shifts 65K, 4-2401 MOD-2, 3-2311, 1403-N1, 2540, 1401 Compatibility From \$35.00/Hour Restaurant Associates Ind. 1540 Broadway bet. 45 & 46th St. New York, New York 10036 Contact: Al Palmo at (212) 974-4966 Elliott Musikoff at (212) 974-4967</div>			
<div> WHEN BUYING OR SELLING GO GREYHOUND FOR SALE 360/30's, 360/40, and 360/50 Special - System 3 Model 10 2020-D, 2203-A1 2560-A1, 2501-A2 GREYHOUND COMPUTER CORP. Home Office Director of Equipment Sales Greyhound Tower Phoenix, Arizona 85077 (602) 248-5978 WANTED All 370's, 360/65's and 360/50's Dallas Office M. Wm. (Bill) Tucker, Jr. Equipment Sales Manager 7540 LBJ Freeway Dallas, Texas 75240 (214) 233-1818</div>		<div>G.E. N.C.R. R.C.A. UNIVAC HONEYWELL Many Think of Us As a Quality IBM Dealer -- We Are! But, Don't Overlook Our Reputation In Non-IBM Equipment. Put Us To Work For You Buying, Selling, Leasing CONTACT: Gary Johnston, Lee Johnston or Larry Donat TELEX 98-5596 American Computer Exchange 29525 Chagrin Blvd. Pepper Pike, Ohio 44122 (216) 464-3881 Member Computer Dealers Assoc.</div>		<div>Time for Sale</div>		<div> BLOCK COMPUTER TIME 370-158 FOR SALE 1 MEG 4 CHANNELS 3330-2314 DISK 12-3470-7 (800-1600) Hi-Speed Printers Punch Paper Tape I/O OCR 3270 Display Mode Console Contact: A. Fendrock (212) 751-5000 Ext. 594 Nabisco, Inc. 425 Park Ave. New York, N.Y. 10022</div>			
<div>BUY • SELL • LEASE IBM 360/370 370/155J1, 1.5MB OEM Core, 4 Block Mpx. Channels, 2 Byte Mpx. Channels, many other features, May delivery, \$900,000. 360/65, 1MB OEM Core, 2 Selector Channels, Multiplexor Channel, immediate delivery, \$600,000 These systems also available with IBM core at slightly higher prices. Features and channels can be modified to your requirements.  IPS COMPUTER MARKETING CORP. 467 Sylvan Avenue, Englewood Cliffs, New Jersey 07632 (201) 871-4200, TWX (710) 991 9677 "MEMBER COMPUTER DEALERS ASSOCIATION"</div>		<div>360/20 FOR SALE 8K Card System 2501/A02, 2560/A01 2203/A01 Now Available Cincinnati Insurance Co. P.O. Box 14567 Cincinnati, Ohio 45214</div>		<div>MASSACHUSETTS Systematic Data Processing Services, Inc. IBM 370/155 DATA CENTER 3 Megabytes Core 3330 and 2314 Disks Batch Computer Time (OS MVT 21.7) Remote Job Entry (Hasp 3.1) Wylbur Interactive System: \$5/CPU min; \$.50/Track/Mo, no connect charge CCA 204 interactive data base management system: \$15/CPU Min; \$1.20/Track/Mo, no connect charge Call SDPS, Sales Dept. — 890-1200 400 Totten Pond Road Waltham, Mass. 02154</div>		<div>Thomas National, Inc. 1775 Broadway, N.Y.C. 370/158 DATACENTER OS-VS — RJE And Other Communications Turnkey Responsibilities DOS Emulation 3330's and 2314's Systems and Programming Support Data Entry Services Convenient 57th St. Location Open 24 Hours Per Day Call (212) 765-8500</div>			
<div>SYSTEMS FOR SALE UNIVAC Fastrand II Drums Fastrand Controllers 9200 - 9300 Systems 1004 - 1005 Systems HONEYWELL 1250-32K System Tape 1250-98K Tape & Disk 1250-98K CPU Only 200 Systems all types GE 435 15 Disks 2 Prnt. Tapes H 115-32K Tape & Disk <div>SPECIAL PDP-11 KA-11-20 12K memory ASR-33 PC 11 HS paper tape RDR/PCH AD Conv. DA Conv. RK03 Disk RK11 Cont. Cent 101 Printer 13M792YB Diskloader Specialists in Data Processing Equipment • Sales • Service 84 Cummings Park, Woburn, Mass 01801 Tel 617-935-6340 - TWX 710-393-0179</div><div>XXX Available 44 KC Tapes 274 Disk Sys. XXX</div></div>		<div>NEW YORK</div>		<div>NEW JERSEY</div>					
<div>URS</div>		<div> HONEYWELL TIME Computer Reserves, Inc. Reserved Computer Time, Inc. (212) 541-8180</div>		<div>I.B.M. - 360-30 All shifts available 65K, 5 - 2401 Mod-2 9 track 2 - 2401 Mod-2 7 track 4 - 2311, 1403-N1, 2540 Prices start at \$35.00 per hour. We also offer complete processing services. Configuration can be modified to accommodate any 360 computer user. We have on-site CE's. UCS Computer Centers Route 80 Dover, N.J. 07885 Contact Bill Kersey at (201) 361-8600 or Sam Amoresano at (201) 361-8601</div>					

TIME FOR SALE	TIME FOR SALE	SOFTWARE FOR SALE	SOFTWARE FOR SALE	SOFTWARE FOR SALE
GEORGIA 360-30 2ND AND 3RD SHIFT 65K 2501-1442 4-2311 1403 with or without tapes Also All Unit Record Equipment and Wats Lines All This for \$25.00 per hour or make offer on full shift Call Atlanta, Ga. (404) 691-7711	ILLINOIS HOW ABOUT 7¢/SEC FOR A 60K REGION? 370/155 With 3330's OS/MVT, HASP HYPERFASTER, AMIGOS • Specializing in RJE • Fantastic Turnaround • Proven Corporate Quality Service • Call WAYNE FRANKHAUSER (312) 531-2434 ALBERTO-CULVER DATA SERVICES 2525 Armitage Melrose Park, Ill. 60160	TAXBREAK *** Payroll tax calculation module *** Calculates payroll withholding taxes for 50 states, federal, FICA and cities. COBOL. \$875 complete. Maintenance service on tax changes available for \$225 per year. ARGONAUT INFORMATION SYSTEMS, INC. 2140 Shattuck Ave., #203 Berkeley, CA. 94704 (415) 845-7991	COMPUTERIZED ACCOUNTS RECEIVABLE Features 1. Automatic Cash 2. Multi-divisional 3. Cash forecasting 4. Deduction notices 5. Unearned discount 6. Dunning 7. Audit trails 8. Customized aging 9. Automatic charge-back 10. Cash tear-sheet 11. Suspense accounts 12. Expanded credit 13. General ledger totals 14. Marginal account reports 15. Credit interchange 16. On-line cash 17. Real-time credit inquiries Benefits Eliminate all these headaches: 1. Tub files 2. Late statements 3. One cash card per invoice 4. Extensive clerical effort 5. Unknown credit risks 6. Unclear detailed non-exception reports 7. Unaware credit managers 360/30 USERS	PAYROLL PERSONNEL Multi-state tax calculations. Unlimited deductions, personnel reports and flexible labor distribu- tion. Some of the features are: • Fixed or Variable Input Formats • Unlimited Earnings and De- ductions • One past Processing • General Ledger and Labor Dis- tribution Output • All state taxes and provision for local taxes • Disc and/or tape versions • DOS or OS versions from 32K • IBM, SDS, H-200, RCA Ver- sions • All COBOL • Complete Personnel Reporting • Personnel Action Forms • Vacation and Sick Leave Ac- counting • Skill Code and Education Code TRY IT FOR 30 DAYS! 30 day free trial 40+ USERS only \$960 Occidental Computer 805 S. San Fernando Rd. Burbank, Calif. 91505 (213) 843-2722
CALIFORNIA *** COMPUTER TIME AVAILABLE NCR Century-100 32K 4-Disc 1/O Writer High Speed Printer \$18.00/hour NAME YOUR SHIFT Contact Mason Pearce (213) 532-7600 ***	IBM 360/370 USERS Computer Time Available 370/158 2 meg, 3 3330 (32m), 3 2314 (24m) 12 3420-5 tape, 2 1403, 3211. OS/VS2, RJE, IMS, TSO, DOS emul. 24 Hours - 7 Days CAN YOU BEAT 8.7 cent/sec for a 64K region? 370/155 2 meg, 3330 (8m), 2314 (8m), 10 3420-5 tape. 370/135 240K, 4 3330's 1 2314, 6 3420-5 Tape. 360/30 64K 5 3420-3dd Tape, 4 2311's. For Further Information CALL RON ELLIS (312) 346-1331 computer research company 200 N. Michigan Avenue Chicago, Ill. 60601 Largest Computer Time Sales Co.	BREAKPOINT™ A NEW PROGRAM FOR INTERACTIVE DEBUGGING OF FORTRAN PROGRAMS ON MINICOMPUTERS ONLY \$200 INCLUDING A SOURCE LISTING WRITE: BINARY SYSTEMS, INC. 88 Sunnyside Blvd. Plainview, New York 11803 (516) 822-1585	COMPUTER SYSTEMS & EDUCATION CORP. David Shefrin 111 Ash Street E. Hartford, Conn. 06108 (203) 528-9211 CSEC AR/70 Thomas Welsh 840 Hinckley Road Burlingame, Calif. 94010 (415) 697-3317	Paymaster Remedies Payroll Problems • a comprehensive payroll system • now serving over 1,000 com- panies • license for as low as \$250/monthly; or purchase • up to 20 customized deduc- tions and/or allowances... all with Y-T-D totals • handles piecemeal, including calculations of make-up pay • accepts input from terminals • job costing/labor distribution • integrates personnel/payroll records • completely compatible with IBM 360/370 batch and RJE; Honeywell 200/2000; and Bur- roughs 2700-4700 COMTECH P.O. Box 734 Reston, Va. 22070 Telephone (703) 471-7141 Canadian Payroll Package: • all the above benefits • plus, bilingual system avail- able • and, complete UIC control Call: (416) 492-1480
MINNESOTA 360/65 1.5 MEG. 8-3330, 4-2314, 4-2401, 1403, 2540, OS-EDOS 7AM-11PM 11PM-7AM GEN. TIME \$90/HR \$75/HR BLOCK TIME \$65/HR \$55/HR *100 HR. MIN. GUAR. CALCOMP 563 PLOTTER \$35/HR CALL bcsi 3050 METRO DRIVE MINNEAPOLIS MINNESOTA 55420 612 854 8892	ILLINOIS 370/158 Virtual OS-MVT-HASP DOS-VS1-VS2- CMS We will give flat price contracts on jobs regardless of how much running time is involved HF/II APT MPSX ICES BLISS CROSSTABS PICS PAYROLL SSP MPS PLAN SAS BMD PROJECT II PAYROLL INVENTORY CONTROL ACCOUNTS PAYABLE ACCOUNTS RECEIVABLE GENERAL LEDGER General Purpose Simulation System Continuous System Modeling Program Urban Transportation Planning System 360 Time sharing remote batch block time Your Programs or Ours USE OUR NETWORK OF BATCH TERMINALS AND 4800 BAUD LEASED LINES CONNECTING THE FOLLOWING CITIES • CHICAGO • NEW YORK • CLEVELAND • ST. LOUIS • MILWAUKEE • LOS ANGELES STATTAB A Division of Statistical Tabulating Corp. (312) 346-7300 Vern Brownworth	MMS Accounts Receivable Eliminates the Long Wait. • Database Design— All Cobol • Open Item or Balance Forward • Multi-company • Flexible Aging • Simplified Cash Posting SOFTWARE INTERNATIONAL Elm Square, Andover, Mass. 01810 (617) 475-5040	SERVICE BUREAUS Provide service to the rapidly expanding Group Medical Practice market. We offer the finest software system avail- able for billing, accounting and revenue distribution. A real profit producer. Available for sale or lease Finserv Computer Corp. 1462 Erie Blvd. Schenectady, N.Y. 12305	HOSPITAL FINANCIAL SYSTEM • Budget Modeling and Forecasting • General Ledger • Productivity Analysis • Step-down Cost Allocation • Trend Analysis • In-Out Patient Costs • Departmental Analysis • Hospital Summaries • Balance Sheet • Flexible Budgeting • Financial Reports by Level of Management Use on your terminal or buy proprietary rights — all in ANSI COBOL. HSA Hospital Financial Services, Inc. 120 East Ogden, Hinsdale, Ill. 60521 359 San Miguel Newport Beach, Calif. 92660 (714) 644-6411
	Software for Sale ACCOUNTING SYSTEMS PAYROLL GENERAL LEDGER ACCOUNTS PAYABLE INVENTORY ACCOUNTS RECEIVABLE IBM SYSTEM/3 USERS IBM 360-70 USERS RPG II BAL COBOL Certified Software Products, Inc. 3140 Harbor Lane North Minneapolis, Minn 55441 612-546-6919	ACCOUNTING IV THE FINEST GENERAL LEDGER AND FINANCIAL REPORTING SYSTEM AVAILABLE Featuring: • Conventional Report Generator • Graphic Report Generator • Matrix Report Generator • Responsibility Reporting • Flexible Budgeting Module • Multiple Currency Version to accommodate foreign subsidiary accounting informatics inc Contact: Ron Kupferman 65 Route 4 River Edge, N.J. 07661 New York (212) 564-1258 New Jersey (201) 488-2100	SYSEX LOOKING FOR SOFTWARE? Free Software Search and Package Appraisal Service Our job is to help you locate the software packages which best meet your needs. There is no charge to you for this service. Write on your company letter- head or call: Systems Exchange Co. 1034 Colorado Ave. Palo Alto, Calif. 94303 (415) 328-5490 SYSEX	Computerworld Sales Offices Vice President — Marketing Neal Wilder Sales Administrator: Dottie Travis COMPUTERWORLD 797 Washington Street Newton, Mass. 02160 (617) 965-5800 Northern Regional Manager Robert Ziegel Account Manager Mike Burman COMPUTERWORLD 797 Washington Street Newton, Mass. 02160 (617) 965-5800 Eastern Regional Manager Donald E. Fagan Account Manager Frank Gallo COMPUTERWORLD 225 West 34th Street Suite 1511 New York, N.Y. 10001 (212) 594-5644 Los Angeles Area: Bob Byrne Robert Byrne & Assoc. 1541 Westwood Blvd. Los Angeles, Calif. 90024 (213) 477-4208 San Francisco Area: Bill Healey Thompson/Healey Assoc. 1111 Hearst Bldg. San Francisco, Calif. 94103 (415) 362-8547

**COMPLETE
LOW COST
DATA-ENTRY SERVICES**

•
OCR SERVICES
SCANNING: HANDPRINT • OCR A
MARK READ • COMPUTER PRINT

•
OCR TYPE SCAN

•
KEYPUNCH • KEYDISC TAPE
UNIVAC • IBM • CMC

**DATA-MIDWEST
CORPORATION**

7803 BLOOMINGTON AVE. SO.
MPLS. MN 55420, (612) 854-5522

4 MIN. FROM MPLS. ST. PAUL INTL. A.P.

USED 370/158J

For Sale by Owner
Available 3rd Quarter

CW Box 4065
797 Washington Street
Newton, Mass. 02160

SOS Shipments Started

General Automation Posts Record Half

ANAHEIM, Calif. — General Automation, Inc. reported record results for the second quarter ended Feb. 2.

Earnings reached \$927,000 or 37 cents a share for the period, compared with \$726,000 or 34 cents a share last year. Last year's earnings included a \$250,000 special credit.

Revenues for the quarter were \$14.1 million compared with \$6.2 million in last year's second quarter.

Acceptance

President Lawrence A. Goshorn attributed the results to continuing acceptance of the company's products, particularly the newly introduced LSI-12/16 microcomputer which features a single-chip processor using sili-

con-on-sapphire technology. Shipments of the new unit have begun, a spokesman said.

Record results were also posted in the six-month period when earnings reached \$1.8 million or 72 cents a share. This compares

with \$1.5 million or 68 cents a share earned last year including a \$586,000 special credit.

Revenues were up 117% to \$26.1 million compared with \$12.1 million for the previous year.

Incoterm Nine-Month Figures Up

NATICK, Mass. — Incoterm Corp. reported increased earnings and revenues in the nine months ended Nov. 23.

The company earned \$1.5 million, including a \$568,000 tax credit, compared with earnings of \$436,663, including a \$178,000 tax credit, in the same period a year ago.

Revenues rose to \$12.2 million from \$7.8 million in the cor-

responding year-ago period.

High Backlog

President Jean N. Tariot said backlog at the end of the period stood at \$7.8 million, the highest level in the company's history.

Tariot also noted that fuel shortages affecting airlines have prompted some existing and potential customers to hold back on procurement plans. Consequently, he indicated, revenues and earnings in the fourth quarter will be lower than expected.

CLEAN DISC CARTRIDGES

...quickly, safely and completely



Texwipe is the only truly effective, day-to-day use of disc cleaning. It removes dirt, dust, and debris. Even carefully cleaned discs can be contaminated by harmful contaminants. Texwipe System 3 (5440) and the Texwipe System 315 (5440) are the only disc cleaners that clean the disc and the data they contain with the Texwipe System 315 (5440) disc motorized cartridge cleaner. The Texwipe System 315 (5440) is the only disc cleaner that cleans the disc and the data they contain with the Texwipe System 315 (5440) disc motorized cartridge cleaner. The Texwipe System 315 (5440) is the only disc cleaner that cleans the disc and the data they contain with the Texwipe System 315 (5440) disc motorized cartridge cleaner.

TEXWIPE
Hillsdale, New Jersey 07642

Acquisitions

General Instrument Corp. has agreed to acquire the assets and business of American Regitel Corp., a two-thirds-owned subsidiary of Motorola, Inc. Both companies are engaged in the manufacture and marketing of electronic point-of-sale systems.

Recognition Equipment, Inc. and Corporation S have delayed their proposed merger until arrangements for restructuring REI's 7-1/2% convertible subordinated notes reach a more definitive stage.

Pullman, Inc. has agreed in principle to acquire Computer Identities Corp. for an undisclosed amount of cash.

Automatic Data Processing, Inc. has agreed to acquire United Data Processing, Inc. for 90,000 shares valued at approximately \$4.2 million. ADP plans to register approximately 44,000 shares of the stock to be issued to UDP stockholders by May 31.

Datacraft Corp. has been merged into Harris-Intertype Corp., following approval of the \$2.5 million transaction by Datacraft shareholders. Datacraft will operate as a subsidiary of Harris, joining its Systems Group.

Tymshare Ends Year With Record Highs

CUPERTINO, Calif. — Tymshare, Inc. reported record earnings for the year ended Dec. 31.

Tymshare posted earnings of nearly \$2 million or 64 cents a share compared with \$1 million or 34 cents a share a year ago.

Income before tax credits jumped 169% to \$1.6 million from \$597,666 in 1972.

Revenues climbed by 46% to \$24 million from \$16.4 million a year ago, and included record fourth quarter revenues, the firm said.

CS-TRAN

Emulation

THE EXORCIST

Have the Evil Spirits of 1401 emulation possessed your CPU?
Have the split personalities of the 360/370s bedeviled your production schedules?
Have your 1401 maintenance programmers mysteriously disappeared?

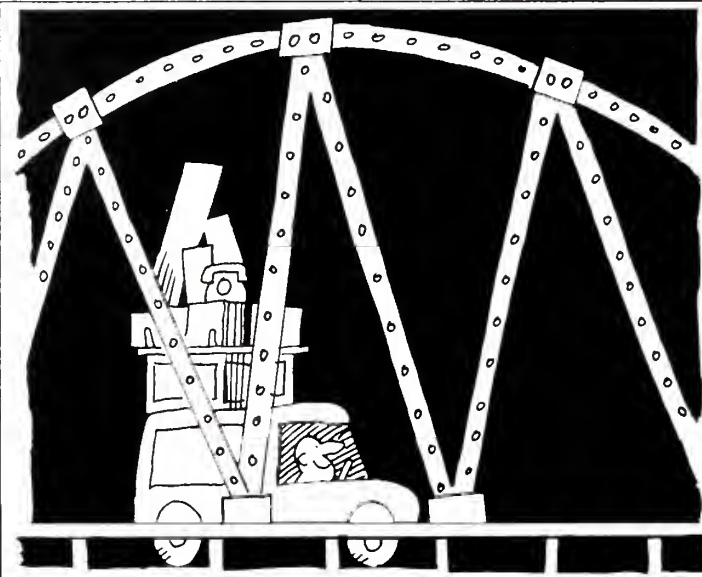
CS-TRAN will exorcise the evil forces of 1401 emulation, simulation and compatibility as it has for many other users.

The **CS-TRAN** 1400 series object to COBOL translation system will save you TIME, CORE and RENT. This unique proprietary system has already converted over 4000 programs from Object to COBOL. Typical results: 360/40 DOS with disk programs - 35% time savings, 370/155 OS tape programs - 3 times faster using 1/3 the core.

HELP!!!
☐ Please rush exorcism kit to me. ☐ Please call me.

Name _____
Company _____
Address _____
City, State & Zip _____
Phone No. _____

ROBERT RUSSO
C-S COMPUTER SYSTEMS INC.
116 John Street, New York, N.Y. 10038 212/349-3535



Our New York Office has just crossed a bridge.

Don Fagan and Frank Gallo, Computerworld's intrepid Eastern Regional salesmen, have pitched a new office. They can now be found overlooking the toll booths of the George Washington Bridge in Fort Lee, New Jersey—just 20 minutes from downtown Manhattan. Their new address is below and they'd be glad to hear from you any time.

Don Fagan — Eastern Regional Sales Manager
Frank Gallo — Account Manager
2125 Center Avenue
Fort Lee, New Jersey 07024
(201) 461-2575

COMPUTERWORLD
THE NEWSWEEKLY FOR THE COMPUTER COMMUNITY

Earnings Reports

ITEL Year Ended Dec. 31		DATA 100 Year Ended Dec. 31	
1973	1972	1973	1972
Shr Ernd \$1.74	\$1.24	Shr Ernd \$1.13
Revenue 108,500,000	40,500,000	Revenue 42,744,000	\$13,082,000
Disc Op d(4,700,000)	100,000	Spec Item a1,397,000	b701,000
Tax Cred 2,100,000	1,200,000	Earnings 3,375,000	(5,958,000)
Earnings 5,600,000	1,700,000	3 Mo Shr .37	.07
a-Restated to reflect discontinued operations. b-From continuing operations. c-Represents charge for discontinuance of IBM 360 computer leasing operations, offset by a gain from the sale of subsidiary Information Storage Systems, Inc.		Revenue 14,580,000	6,588,000
		Spec Cred a329,000
		Earnings 1,131,000	211,000
		a-Tax-loss carryforward credit. b-Debit; from cumulative effect on year prior to 1972 of a change in accounting in 1972.	

SANDERS ASSOCIATES Three Months Ended Jan. 25	
1974	1973
Shr Ernd \$1.17	\$1.24
Revenue 39,972,000	43,095,000
Tax Cred 329,000	318,000
Earnings 773,000	1,094,000
6 Mo Shr .47	.46
Revenue 78,721,000	81,789,000
Tax Cred 838,000	617,000
Earnings 2,150,000	2,113,000

PLANNING RESEARCH Three Months Ended Dec. 31	
1973	1972
Shr Ernd \$1.10
Revenue 27,010,000	\$22,784,000
Spec Chg 669,000	a6,572,000
Earnings 669,000	(6,347,000)
6 Mo Shr .19
Revenue 52,265,000	45,683,000
Spec Chg a(6,572,000)
Earnings 1,282,000	(5,765,000)

a-Write-off resulting primarily from discontinuance of contract with American Automobile Association.

APPLIED DIGITAL DATA SYSTEMS Year Ended Nov. 30	
1973	1972
Shr Ernd \$1.17
Revenue 3,805,394	\$1,694,318
Spec Cred a232,445
Earnings 584,320	(52,303)

a-From tax-loss carryforward credit less expense from withdrawal of public offering.

ELECTRONIC ASSOCIATES Year Ended Dec. 28	
1973	1972
Shr Ernd \$1.17	\$1.61
Revenue \$44,294,000	43,256,000
aSpec Cred 39,000	688,000
Earnings (3,924,000)	1,647,000
3 Mo Shr .29
Revenue 13,034,000	13,873,000
aSpec Cred 198,000
Earnings (3,407,000)	778,000

a-In 1973, tax-loss carryforward credit; in 1972 year, consists of tax credit plus gain on sale of business, less loss from currency realignment; in 1972 quarter, tax credit less loss from currency readjustment.

STORAGE TECHNOLOGY Year Ended Dec. 28	
1973	1972
Shr Ernd \$1.75	\$1.14
Revenue 56,596,000	26,311,000
Tax Cred 1,600,000	1,378,000
Earnings 5,981,000	3,722,000

*** WANTED ***

Firms to: Buy
Sell
Lease
Sub-Lease

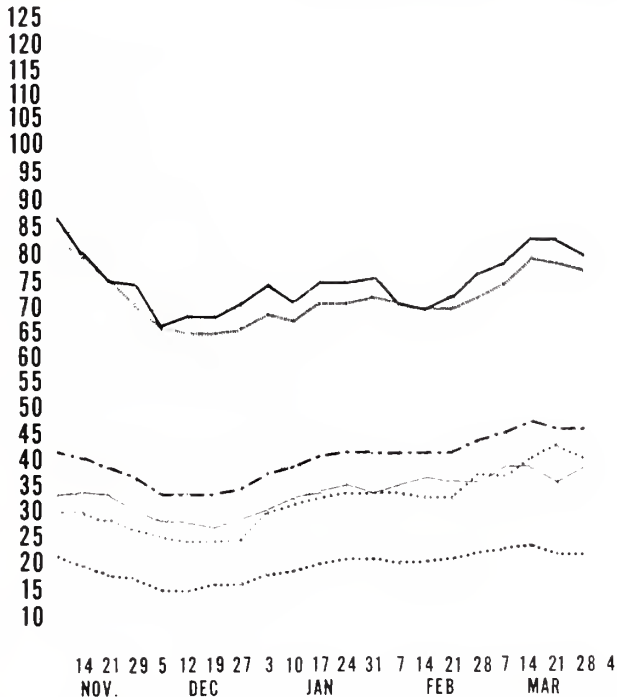
360 & 370
Systems and I/O

Write or Call Collect Today.
It's our only business.

NVC COMPUTER SALES, INC.
Suite 616, Benjamin Fox Pavilion
Jenkintown, Pa. 19046 • (215) 887-5404
Member Computer Dealers Assoc.

COMPUTERWORLD Computer Stocks Trading Indexes

- Computer Systems
- Software & EDP Services
- Peripherals & Subsystems
- Leasing Companies
- Supplies & Accessories
- CW Composite Index



Randolph... your neighborhood computer leasing company.

With offices in thirteen cities, Randolph... your neighborhood computer leasing company.

Northeast	Midwest	Southwest
437 Steamboat Road Greenwich, CT 06030 (203) 661-1200 (203) 661-1177	8110 Elmwood Road Rockville, MD 20850 (301) 770-6966	1545 W. Main Street Dallas, TX 75201 (214) 741-1000
Box 1963 100 Federal Street Boston, MA 02105 (617) 434-4041	1800 Peachtree Center Atlanta, GA 30309 (404) 688-6931	6440 Highway 101, Suite 108 Houston, TX 77060 (713) 666-0411
621 Country Club Road Avon, CT 06001 (203) 673-0435	8050 Henshaw Rd. Cincinnati, OH 45240 (513) 293-6001	West 1111 W. 10th St. Los Angeles, CA 90017 (213) 680-9196
20 Cornhill Place Englishtown, NJ 07726 (201) 446-6300	625 North Michigan Ave. Chicago, IL 60611 (312) 787-4214	525 University Ave. Evanston, IL 60201 (312) 327-7801

RCC RANDOLPH COMPUTER COMPANY
Division of Firstbank Financial Corporation
A subsidiary of the First National Bank of Boston

Computerworld Stock Trading Summary										All statistics compiled, computed and formatted by TRADE★QUOTES, INC Cambridge, Mass. 02139	
TRADE★QUOTES											
COMPUTER SYSTEMS											
SOFTWARE & EDP SERVICES											
LEASING COMPANIES											
PERIPHERALS & SUBSYSTEMS											
EXCH: N=NEW YORK; A=AMERICAN; P=PHIL-HELT-WASH L=NATIONAL; M=MIDWEST; O=OVER-THE-COUNTER O-T-C PRICES ARE BID PRICES AS OF 3 P.M. OR LAST BID (1) TO NEAREST DOLLAR											



ITEL can really soup-up your computer.

If you want extra performance in your data processing system, ITEL peripherals have a lot going for them.

Take our money-saving add-on Monolithic Memory. It lets you exceed IBM's capacity limit at far less cost. On the 360/22 up through most 370 models. For example, it expands a 370/155's memory from two megabytes to four megabytes—a 100% increase!

Then, there's our 7330 Disk Drive Subsystem for 360/50, 360/65 and 370 systems. A compact, waist-high unit that handles massive data bases up to 1,600,000,000 bytes. Average access time is a speedy 27 milliseconds. And you can specify ITEL's Fixed-Head File for even faster access and transfer times for virtual storage models.

At ITEL, we couldn't have acquired over half a billion dollars in IBM computer leasing experience without finding room for improvement.

Your financial alternative.

ITEL
CORPORATION
DATA PRODUCTS GROUP

One Embarcadero Center, San Francisco, California 94111, Phone (415) 983-0000